THE MARINE REVIEW

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WHITE STAR LINE TO ENTER CANADIAN TRADE.

It is officially announced that early next year the White Star Line will enter the Canadian trade, and, in conjunction with the Dominion Line, maintain a service between Liverpool, Quebec and Montreal, the new venture to be known as the White Star-Dominion Service. With the ever-increasing development of Canada, the White Star feel that the introduction of the most modern and up-to-date tonnage into the trade is extremely desirable, and the two steamers, each of 14,000 tons gross register, are now being built at Belfast, which it is anticipated will answer the most exacting requirements both of traders and passengers. It had originally been intended to name these vessels the Alberta and Albany, but following on the decision of the White Star Line to associate itself with Canada, the new steamers will instead be called the Laurentic and Megantic.

In one of the new vessels, the Laurentic, a new arrangement of machinery will be introduced. Reciprocating engines have a very satisfactory record in the White Star Line, whose vessels have attained a reputation for regularity and successful working, and it has been claimed that with the quadruple or four-crank triple expansion engines on the "balanced" principle the reciprocating engines in White Star steamers have been brought to a high state of perfection, both as to the efficiency of their motive power and the abolition of vibration in the ship. Nevertheless, the public are always interested in new developments, and turbines having come more to the front of late years, there has been naturally some curiosity as to whether this well-known line would still adhere to the reciprocating engines or adopt turbines, like some of the other companies. They have decided upon a new departure in the propulsion of steamships. The propelling power of the Laurentic will be a combination of reciprocating engines with a low-pressure turbine. She will thus be a triple screw steamer, each of the wing propellers being driven by four-crank triple-balanced engines, and the central propeller by a turbine. The object of this combination is to retain the advantages of the highly-perfected balanced reciprocating engines, and at the same time get the benefit of the further expansion of steam in a low-pressure turbine.

The reciprocating engines will use steam of 215 pounds pressure per square inch. After the steam has done its work in these engines the exhaust steam from the four low-pressure cylinders will pass into the turbine, in which it will be expanded down to 2 pounds absolute pressure before exhausting into the condensers. The driving force of the ship will thus be utilized to the utmost extent by means of this combination, which, moreover, has the advantage of avoiding the combination of the astern turbine which is necessary in steamers fitted with turbines only, as in this ship when the vessel is required to go astern the exhaust steam from the reciprocating engines will pass direct to the condensers. Then, again, for maneuvering in and out of port the reciprocating engines only will be required, and as they will develop over three-fourths of the total combined horsepower they will be more than sufficient for this purpose.

It is hoped that the Laurentic will be ready by the end of the year, and she will make her first few voyages in the Liverpool-New York service of the White Star Line, being transferred to the Canadian trade as soon as the St. Lawrence opens for navigation in the spring of 1909; the sister vessel will take her place in the service shortly afterwards.

The Laurentic and Megantic will sail alternately with the Canada and Dominion, of the Dominion Line, and will thus complete a weekly service.

The managers of the White Star Line announce that it will be their aim to maintain the new service at the highest pitch of efficiency, and in consonance with the best traditions of its New York steamers.

INDUSTRIAL LAW LEAGUE.

The Industrial Law League, 170 Broadway, New York, has been organized to deal with legal cases involving technical matters, and ought to prove of great service to manufacturers and inventors having business in the east. Through a corps of legal specialists comprising the law department, the league will institute proceedings directly or as associates for out-of-town or foreign interests and are available on short notice for examining witnesses preferably in or about New York, and particularly in patent interference and infringement suits. A chain of associates throughout continental Europe, Great Britain, the colonies, South America and Canada also enables the league to investigate and prosecute foreign interests with dispatch. The league solicits the correspondence of out-of-town attorneys, merchants, contractors, manufacturers and the general public requiring alert and competent attorneys. The league will attend to the proper closing of important transactions, represent a client in negotiations, institute legal pro-

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ceedings in his behalf, attend hearings and examine bankrupt details, investigate and report on commercial or industrial operations, collect or bring suit on the client's claims and do the thousand and one other things which might otherwise require his presence in New York.

The Industrial Law League's patent department is entirely separate and has unusual facilities for soliciting United States and foreign patents, trade marks, designs and copyrights. Following are the fixed charges for service, exclusive of government fees for patents in the United States and Canada:

For the United States patent....$25.00
For the Canadian patent, short term 25.00

Where both are abroad a single fee of $40 covers them exclusive of government fees. After the application has been filed the inventor is safe to manufacture and should then mark his invention "Patent Applied For." Within six months after the United States patent has been allowed a final government fee of $20 must be paid before the patent can issue. By this time the total cost of the United States patent and Canadian patent when applied for through the league amounts to $95 which includes all costs and disbursements, together with the preparation of all papers, drawings, amendments and the payment of all government fees in both countries. There are no extra charges no matter how complicated the invention may be.

The Industrial Law League has just put out a little booklet describing its services which will be sent to anyone interested. It contains some very interesting remarks about the average patent attorney. The little booklet is well worth having for the specific information which it imparts.

Rear Admiral Casper F. Goodrich, commandant of the New York navy yard, has been appointed president of the Naval Retiring Board to succeed Rear Admiral Robley D. Evans, who has just relinquished command of the Atlantic fleet on account of ill health. The proceedings of this board are secret, its work being to select from the naval officers those who should be retired from active service.

Three gates of lock 18 in the Welland canal were carried away by the steamer D. D. Calvin, last week, resulting in damage of $4,000.

THE PROPELLING POWER OF THE FUTURE.

BY J. H. BILES, LL.D., PROFESSOR OF NAVAL ARCHITECTURE AT GLASGOW UNIVERSITY.

The 19th century began with the almost unchallenged supremacy of the sailing ship and ended with its almost total extinction. The 20th century began with the almost unchallenged supremacy of the steam propelled reciprocating engine, and in the eighth year (or is it the ninth) of its existence we are all looking with hand-shaded eyes for the propelling power of the future. What are the signs by which we shall recognize it? There are at least three: (1) it must be of increased efficiency, (2) it must not weigh more per unit of power (including fuel), (3) its cost must be such as to give a higher commercial efficiency. It may be adopted in warships if it fulfills the first two, but unless it fulfills the third it will not be generally adopted in any class of merchant ships.

The turbine has threatened to displace the reciprocating engine, but it has hardly made the threat before its inventor has coupled it up with its rival, with the intention of obtaining the better qualities of each system and of discarding the worse. The turbine annexes the region of low pressure which is outside the effective reach of the reciprocating engine. The turbine losses are more marked in the region of higher pressures, where the blade-lengths are short and the clearances large, in proportion to the total area of steam stream. Employing each type of engine in the region in which it is more effective, a higher resultant efficiency is likely to be obtained. If, however, we look back we shall see that progress, in the matter of power produced per ton of weight of engine, has been made along the line of increasing revolutions, and this has culminated in the turbine, whose speed is much greater than that of the reciprocating engines doing the same work. Thirty years ago Atlantic steamers of high power averaged 50 revolutions. Today, those having reciprocating engines reach 90, while turbines in the same class of steamer reach 180. In battleships, cruisers and channel steamers similar changes have taken place. The return in part to the reciprocating engine must be associated with the disadvantages which time has been overcoming. But disadvantages in engine weight may be out-balanced by gain in efficiency, because if it takes less steam to develop power it takes less boilers to produce the steam, and less coal has to be carried to be burnt in the boilers. But it will only be because the disadvantage of the low revolutions of the reciprocating engine cannot be avoided that such a system will be generally adopted. The inherent qualities of the turbine which give it its advantages as a power producer are its capability of running at high revolutions and its efficient use of steam. In applying the turbine to propelling ships by screws we have two efficiencies to take into account; that of the engine, and that of the screw. With the increase of revolutions of the reciprocating engines the necessary changes in propeller did not involve large changes in its efficiency, but the possible increases in revolution of turbine when directly driving a propeller would be so great as to produce some very low efficiencies of screw. The increase of revolutions is therefore so limited that the fullest advantage cannot be taken of the possible increased efficiency of the turbine. Where, as in electric power stations, there is no such limit placed upon the revolutions of the turbine they are run considerably faster than in ships, and it has not been found necessary to revert in part to the reciprocating engine. To obtain the best efficiency of turbine where unaffected by propeller considerations, it has generally been run faster than when directly connected to a screw. Our attention has therefore been directed to the connection of the turbine with the propeller in such a way that their revolutions need not be the same. This can be done by mechanical gearing, but no one sees fit to incur the disadvantages of such a combination on a large scale. There is a further respect in which the turbine suffers in comparison with the reciprocating engine as a screw propeller driver. For varying speeds of ship varying revolutions of propeller are necessary, but a turbine has maximum efficiency for speeds near the geatest, and it suffers much in efficiency by being run at much lower speeds. The shape of the blades of the turbine which give maximum efficiency is given on the basis that the peripheral speed of the turbine is about one-half that of the steam impinging on these blades. If they run at much lower speeds, the conditions of maximum efficiency do not hold, and uneconomical results follow. In electric power stations, a variation of power is obtained, not so much by varying the speed of the turbine as by varying the amount of steam used. A small-

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er amount is used, but the efficiency is more nearly maintained than in a marine turbine where variation of power is only obtained by varying the speed.

There are, therefore, two means by which the full efficiency of the turbine may be obtained: (1) running the turbine at the highest practicable revolutions, trusting to some transmission system which will revolve the propeller at the speed of its maximum efficiency; (2) varying the power delivered by the turbine without varying the revolutions very much. It is evident that the suggestion of mechanical gearing already made could not easily fulfill both conditions. The obvious method to adopt to secure these means is that of electric transmission by dynamo and motor, the dynamo running at high revolutions and practically constant speed whatever electric power is given off by it, while the motor is running at varying speed according to the electric power put into the propeller. The question then arises what kind of efficiency such a combination will have, as there are transmission losses, and unless these are less than the gain in propeller and turbine efficiency, there will be no net gain. If we assume that the propeller can be run at a speed which has been found to be efficient in the reciprocating engines, we may compare the efficiency with that of propellers used in similar vessels having turbines directly connected. The cross-channel steamers Antrim and Londonderry, the Cunard steamers Caronia and Carmania, and the cruisers Topaze and Amethyst are cases in point, having respectively in each class reciprocating and turbine engines. The best figures available give in these classes respectively, relative differences in efficiency of 10 per cent, 7 per cent and 6 per cent. The losses in transmission may be put at not more than 10 per cent, so that there appears to be a prima facie case for further investigation.

Some of the cases taken for vessels with reciprocating engines, to some extent, suffer for the same reason that the turbine does, namely, that in order to economize weight of engines, revolutions are made higher than they would be for best efficiency of propeller.

Electricians will at once point out that in a motor on a propeller running at varying powers and speeds, the change of speed in the motor is usually associated with absorption of power in the speed changing devices, or there will be other equally disadvantageous features in the motor. Mr. Mavor, of Glasgow, who has given considerable attention to this subject, claims to have surmounted this difficulty by (1) adopting the multiphase alternating current system in the dynamo and motor; (2) by the invention of a differential motor consisting of two motors mounted co-axially, one running outside the other.

Mr. Mavor says:—"Motors are connected in such manner that the speed variation may be effected as follows:

"For slow speed, by running the regulating motor in the reverse direction to the direct connected motor.

"For intermediate speed, by running the direct connected motor alone, the regulating motor being stopped.

"For full speed, by running the regulating motor in the same direction as the direct connected motor.

"This arrangement requires no spur wheels or friction gearing. Each motor is controlled by a simple reversing switch, without any other mechanism, and there are no power wasting devices.

"The advantages of the adoption of this system are well illustrated in the case of a ship of 17,000 horsepower on three propellers at 21 knots maximum speed. At full speed the 17,000 H. P. is provided by one turbo-generator of 10,000 H. P., which directly drives the direct connected motors, and by a generator of 7,000 H. P., which drives the regulating motors, the whole plant being run at full speed and full power. When the speed is dropped from 21 knots to 18 knots, the 7,000 H. P turbo-generator is stopped, and the coal consumption per horsepower is the same at 18 knots as at full speed. When the speed is further reduced the 10,000 H. P. may be stopped and the smaller unit again applied.

"It will thus be seen that in addition to the economy attainable at full speed, there is a very great improvement in economy at all lower speeds, owing to the possibility of choosing a suitable size of power unit for each speed. This advantage also appears in cases where the power required to drive the ship, at any given speed, is varied by the condition of weather or load; in short, the electric arrangements provide a means of approximating at all working speeds of the ship to the economy attainable on the trial trip at full speed. It is, of course, obvious that at very low speeds of the ship the economy cannot come within this region, but on the electric arrangements it is very much better than that attainable by the ordinary means."

These powers, will, therefore, all be developed at much higher efficiencies than in the present marine turbine as connected directly to the propeller. For powers between any of these named, variations in the speed of the dynamos are necessary, but they are not great enough to seriously alter the efficiencies. Electric transmission may, therefore, be considered as one of the propelling powers of the future. Whether the system of motors proposed by Mr. Mavor fulfills all the conditions necessary for adoption time will show, but it certainly is well worth considering by anyone contemplating new ships. It has the merit of being equally powerful ahead and astern, and avoids the difficulty of reversing which turbine driven vessels have sometimes been supposed to possess. It has the further merit that no individual feature of it is new or experimental. Large propellers are not new, motors are not new, and turbines of constant speed are in common use. There appears to be no possibility of failure in it on account of the elements of the combination.

The Mavor system of electric transmission, as described, is for steam driven turbines, and does not, therefore, deal with the boiler, except in so far as the gain in efficiency may reduce the amount of boiler necessary to be carried. It may, however, be applied to other systems of power where electric transmission is of advantage, i. e., where the electric generator has a high efficiency of weight, power or cost at revolutions too high or too low to suit the most efficient screw by direct connection. For instance, a series of internal combustion engines of high speed and small power may be used to create current which could be poured into motors driving propeller shafts at efficient revolutions. Such a combination would dispense with boilers and coal in bunkers, whose place would be taken by petrol or petroleum in tanks, or perhaps by producers using less coal. There is no doubt of the superiority in fuel efficiency of the internal combustion engine, but in considering weight efficiency it has to be borne in mind that this can only be secured in the engine by high revolutions, and a limit to these is imposed by the

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strength of the materials of the moving parts in relation to their specific gravity. Consequently the best weight efficiency is likely to be obtained by adopting a large number of fast running small engines in which case a system of transmission such as that proposed by Mr. Mavor becomes a necessity.

It, therefore, seems that we may reasonably look forward to an early adoption of a system of electric transmission in combination with the turbine generally, and with the internal combustion engines in special cases. The former system lends itself more readily to large powers, but the latter offers such advantages in fuel economy, and in warships of clearness of deck, that its other disadvantages may ultimately be either surmounted or accepted, and its general adoption become a reality.

BATTLESHIP MICHIGAN LAUNCHED.

The battleship Michigan, the first of all the big gun battleships of the United States navy, was launched last Saturday at Camden, N. J. The day will be an historic one in the navy, for when the Michigan takes to the water it will mean that so far as future construction is concerned all of the vessels of the American navy will be of the powerful type, now popularly known as the Dreadnought class.

Miss Carol Barnes Newberry, the daughter of Assistant Secretary Newberry, of the navy, named the new battleship. Grouped around her were Gov. Warner, of Michigan, and his staff, Secretary Newberry, and every member of the Michigan delegation in congress.

When completed, the Michigan, which is already half finished, will be, in appearance and armament, distinctly different from any of the battleships now flying the American flag. Her most noteworthy feature will be her four great turrets, out of each of which will protrude a pair of 12-in. guns of the latest and most powerful type. These turrets, which are so arranged that every one of them can be used in a broadside, either to the port or starboard, will be mounted on the axial line of the ship, one pair aft and the other pair forward of the superstructure. The turrets are placed one ahead of the other, it being necessary to shorten the superstructure, with the result that the two funnels and the two long pole masts will be very close to each other.

Forward the freeboard of the new ship will be the same as that of the Connecticut, the flagship of the Atlantic fleet, but aft of the superstructure, for the purpose of saving weight, a reduction of about 8 ft. below that of the Connecticut has been effected. The elevation of the turrets is such that the rear turret, both in the forward and aft pairs can be fired directly over the top of the one in front.

Another peculiarity will be the arrangements of the ship's masts, the forward mast being on the starboard and the after on the port side of the Michigan. The armor belt line, which has been so much discussed recently by Reuterdahl and others, is 8 ft. wide and over 300 ft. long, the thickness amidships varying from 11 in. at the top to 9 in. at the bottom, while the armor that will protect the magazines will vary from 1 ft. at the top to 10 in at the bottom.

Above the armored belt line will be a casement protection, which will be 8 in. thick at the top and 10 in. at the bottom, which in extent and thickness has never before been approached in any American battleship. At the after end of the belt armor will be fitted athwartship armor 10 in. in thickness, while at the forward end of the belt armor will be an athwartship armor bulkhead the same thickness, extending clear across the ship. An athwartship casemate armor bulkhead will also be fitted between the shell plating and the barbettes, the berth and main decks, which will be 8 in. thick.

The armor that will protect the barbettes will vary in thickness from 10 to 8 in., dependent on whether or not it is flanked by the side armor of the battleship. In the case of each of the four turrets the side armor will vary from 12 in. to 8 in., while the plates on top will be 10½ in. thick. The turrets will be electrically controlled, while the most complete arrangement for obviating the dangers of turret explosions, flarebacks, and other accidents which have caused so many disasters in the navy will be used to protect the men who will handle the great guns on the Michigan.

When completed the Michigan will displace 16,000 tons, and will carry in addition to her battery of eight 12-in. guns, twenty-two 3-in. guns and sixteen small rapid-fire guns. She will also be fitted with two submerged 21-in. torpedo tubes. Her engines will be of 16,000 H. P. each, and the vessel must make 18½ knots an hour on her trial trip.

The South Carolina, a sister ship of the Michigan, which is under construction in Philadelphia, will be ready for launching in a few weeks.

H. W. Hubbell & Co. dissolved partnership in January last and sold their dredging fleet to a new corporation known as the Duluth Marine Contracting Co. Mr. Hubbell retired from the dredging field after 32 years of activity owing to ill health.

NEW DREDGERS FOR THE EAST.

Two very interesting dredgers have been recently constructed at the works of Messrs. Wm. Simons & Co., Ltd., Renfrew. One of these is the hydraulic dredger Alexandra, built to the order of the secretary of state for India, for work on the waterways of, and canal construction in, Bengal. This dredger is of the shallow-draught type, and is designed for opening up canals, depositing the dredged spoil on or beyond the banks. Her dimensions are as follows: Length, 205 ft.; depth, 19 ft.; and breadth, 40 ft. A special feature of this dredger is the provision of a Robinson rotary cutter arranged to work in front of the suction orifice for disintegrating clayey material to be dredged. This is attached to the frame carrying the suction pipe, which works in a well forward. The cutter will be used for hard clayey and other difficult material, other than stones or rock. It is strong enough to encounter rock without breaking, and should it come in contact with such material the engines driving it will simply stop. High-pressure water jets are provided for disintegrating sand. The two centrifugal pumps in series for the jets are driven by an enclosed high-speed compound engine. The cutter is driven through bevel gearing by another compound engine. The suction pump is driven by a triple-expansion engine of 900 I. H. P.; and for the delivery of the material a 600-ft. floating pipe line, carried on circular pontoons, is provided. The vessel is fitted with two sets of triple-expansion engines, and will steam at nine miles an hour. Steam is provided by two cylindrical multi-tubular boilers, working at 160-lb. pressure. There is one main condenser for all the engines on board. A workshop, with forge and machine tools, is arranged on deck for carrying out repairs. The dredger is, of course, fitted out completely with all necessary auxiliaries. The other dredger, recently completed by this firm, was launched on Thursday, the 30th ult., and was built to the order of the Rangoon port commissioners. In this vessel all telegraphs, gages, handles for controlling the propelling and pumping engines, bow and stern winches, and pipe hoist winch are in the operating house above the awning deck, thus enabling one man to control the entire mechanism of the vessel, and direct all operations, whether dredging or steaming, while having also the pipe line and mooring chains under observation. The pumping plant consists of powerful centrifugal sand pumps. The wearing surfaces of the pumps are protected by renewable liners of hard steel. Each pump is driven by a set of triple-expansion surface-condensing engines. The sand pumps and their en-

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gines are placed in one engine room, together with one large main condenser, air pumps, centrifugal circulating pumps, feed and bilge pumps, and the other usual engine-room auxiliaries. The suction pipes are fitted with nozzles, and powerful water jets are fitted to the undersides of the nozzles. The pump discharge pipes are united into one common discharge pipe. The floating pipe line is built up of sections carried on pontoons. The maneuvering winches are fitted at the bow and stern. The vessel is propelled by two sets of triple-expansion surface-condensing marine engines. Steam is generated for all propelling, pumping and auxiliary machinery by high-pressure marine multitubular steel boilers of very large capacity, for burning low-grade coal.

AMERICAN BRIDGE TO CROSS RIVER NILE AT CAIRO, EGYPT.

Cable advices from Cairo, Egypt, state that the contract for the construction of a new bridge to cross the Nile river at Cairo which will cost more than $1,500,000 has been let by the ministry of public works of the Egyptian government to the Compagnie de Fives-Lille of France, after an international competition in bidding for its construction. The new bridge which will be located at the deepest part of the Nile river and will lead direct to the site where the Boulac Museum stood, is to be built in accordance with plans prepared by the late Sir Benjamin Baker, of London, the engineer of the great Forth bridge, Scotland, and the Scherzer Rolling Lift Bridge Co., of Chicago, the latter company also furnishing consulting engineering services during erection. The entire work is to be executed under the charge of the ministry of public works of the Egyptian government and it is expected that the new bridge will be completed and in service before the end of the year 1910.

This large modern bridge will be in striking contrast to some of the old types of slow moving bridges across the Nile. It has a total length between abutments of 274.5 meters. The total width of the bridge will be 18 meters divided into two foot paths of 3 meters each, a tramway track of 5 meters to carry double lines of electric tramway of 1 meter gage, and 7 meters of road clearance. The structure will consist of a Scherzer rolling lift bridge with four fixed approach spans. On the Boulac side of the Nile quay walls will be constructed on masonry wells. The south end of the abutment on this side of the river will join the existing quay wall and the north end will utimately be joined to the quays under construction. The piers and abutments which will be of Assouan granite are to be built on foundations to be sunk by compressed air. The Scherzer rolling lift bridge will have a movable span of 30 meters to allow the passage of boats.

In order to facilitate the heavy water and land traffic at this site which is the most prominent part of the Egyptian metropolis, the Scherzer rolling lift bridge is designed to operate very rapidly, the time required to open or close the bridge being less than 30 seconds. This result is accomplished by the use of the most modern electric equipment.

LAKE VESSELS SOLD TO AMERICANS SINCE JUNE, 1907

Sch. Aberdeen, W. H. Hackett, Ogdensburg, N. Y.
Tug Alert, Pennsylvania Fishing Co., Erie, Pa.
Tug Andy, Chicago Lighterage Co., Chicago, Ill.
Tug Angler, William Dunn, Cedarville, Mich.
Str. Annie D., J. C. H. Muhlenberg Jr., Sheboygan, Wis.
Gas. Anona, Walter Kitchen, Omro, Wis.
Str. Armour, P. D., George B. Taylor, Erie, Pa.
Gas. Arrow, John H. Riley, Menominee, Mich.
Sch. Ashford, Joseph A. Hutton, Rondout, N. Y.
Sch. Atmosphere, E. W. Thompson, Port Huron, Mich.
Str. Badger State, Badger State Trans. Co., Detroit, Mich.
Str. Banks, Louis, Frank A. Handy, Dunkirk, N. Y.
Sch. Beaver Queen, S. A. Marting, Charlevoix, Mich.
Str. Benton, Adelaide M. Jex, Toledo, O.
Sch. Blaine, James G., George Hall Coal Co., Ogdensburg, N. Y.
Sch. Bock, Isolda, Ole Jensen, Manitowoc, Wis
Str. Brown, Willie, James Davidson, Bay City, Mich.
Tug Buckeye, Pennsylvania Fishing Co., Erie, Pa.
Str. Bues, H. F., H. R. Spencer, Duluth, Minn.
Str. Burgard, Great Lakes Const. Co., Buffalo, N. Y.
Sch. Butman, Myron, Adolph Green, Green Bay, Wis.
Str. Caledonia, John J. Boland & Co., Buffalo, N. Y.
Sch. Cape Horn, Win Schlosser, Milwaukee, Wis.
Str. Capt. Hemans, Weston U. Cline, Massena, N. Y.
Sch. Carpenter, A. A., Adolph Green, Green Bay, Wis.
Sch. Carrier, Henry Caeser, Chicago, Ill.
Sch. Case, J. I., Frank Ronecker, Tonawanda, N. Y.
Str. Castanet, O. G. Staples, Washington, D. C.
Sch. Challenge, Martin Carlson, Sheboygan, Wis.
Sly. L. M. Haarvig, Chicago, Ill.
Str. Chequamegon, R. Floyd Clinch, Chicago, Ill.
Str. Chili, C. W. Elphicke, Chicago, Ill.
Sch. Christiana, William Gabrielson, Menominee, Mich.
Str. Ciscoe, Edwin M. Carson, Manistique, Mich.
Str. City of Green Bay, C. B. Moiles, Saginaw, Mich.
Sch. City of Toledo, Harris W. Baker, Detroit, Mich.
Sch. Coates, L. B., William McCullouch, Port Huron, Mich.
Gas. Columbus, John Deist, Sandusky, O.
Stv. Contaluta, Norman D. Carpenter, Detroit, Mich.
Sch. Cook, Mary Ellen, Claus Weberg, Marinette, Wis.
Stv. Cornelia, Andrew H. Crawford, St. Joseph, Mich.
Sch. Coyne, Emma L., Michael J. O'Brien, Cleveland, O.
Str. Cresswell, John J. Freitus, Buffalo, N. Y.
Str. Crouse, J. S., Charles Anderson, Sheboygan, Wis.
Str. Culligan, Patrick, Hope Transit Co., Alpena, Mich.
Str. Deer, Oscar Hurkett, Au Sable, Mich.
Str. Dewar, John D., Michigan Salt Transportation Co., Manistee, Mich.
Sch. Dimmers, C. H., E. D. Fish, Buffalo, N. Y.
Str. Dixie, W. W. LeFevre, Tuston, Wis.
Tug Dixon, S. O., H. J. Friebel, Milwaukee, Wis.
Sch. Dobbins, D. P., William Burns, Detroit, Mich.
Str. Dow, Neal H., Charles B. McGiven, Erie, Pa.
Tug Duncan City, Bert Rasch, Chicago, Ill.
Str. Eagan, Wiley M., George B. Taylor, Erie, Pa.
Gas. Eclipse, Andrew N. Johnson, Chicago, Ill.
Str. Edson, C. R., American Construction Co., Cleveland, O.
Tug Effie B., Pennsylvania Fishing Co., Erie, Pa.
Str. Elsa M., A. Allen, Sturgeon Bay, Wis.
Gas. Emma, William H. Leos, Suttons Bay, Mich.
Tug Evans, J. J., W. W. Hinton, Two Rivers, Wis.
Str. Evelyn, Co-operative Coal & Ice Co., Oshkosh, Wis.
Sty. Farragut, Nicholas Larson, Waukegan, Ill.
Str. Fashion, M. B. Johnson, Ashland, Wis.
Str. Faustin, John N. Mullen, Windsor, Ont.
Sch. Fillmore, Clarence J., Edgar B. Foss, W. Bay City, Mich.
Tug Fisher, George B., A. & L. B. Dohlmer, Dunkirk, N. Y.
Tug Fisherman, Joseph Valentine, Hammond, Mich.
Str. Fitzgerald, R. P., George B. Taylor, Erie, Pa.
Str. Fitzgerald, W. E., D. Sullivan, Chicago, Ill.
Str. Flora, Saginaw Valley S. S. Co., Saginaw, Mich.
Gas. Flora V., Chas. Paull, South Haven, Mich.
Sch. Fournica, Sofie, Junus Martin, St. James, Mich.
Str. Frank S. Jr., F. H. Jones, Vermillion, O.
Str. Friant, Thomas, Benjamin Lewis, Sault Ste. Marie, Mich.
Sch. Fulton, J. R. Blackwood, Detroit, Mich.
Tug George E., Embury-Martin Co., Indian River, Mich.
Sch. Georger, F. A., M. J. Calvin, Buffalo, N. Y.
Sch. Georgia, L. G. Schiller, Green Bay, Wis.
Sty. Gertrude, Walter S. Lloyd, Duluth, Minn.
Str. Gordon, R. J., G. H. Atherton, Boyne City, Mich.
Str. Gould, E. F., John D. Baker, Detroit, Mich.
Gas. Grace J., H. Christiansen, Duluth, Minn.
Sch. Green, J. L., George H. Holmes, Alpena, Mich.
Str. Hall, Fred B., W. T. Johnson, Duluth, Minn.
Tug Harlem, George A. Walker, Buffalo, N. Y.
Gas. Harvey, J. M., Edward R. Oswald, Milwaukee, Wis.
Sch. Howard, Kate E., John A. Carlson, Marinette, Wis.
Gas. Ida Caroline, Manitowoc Dry Dock Co., Manitowoc, Wis.
Sch. Industry, Herbert L. Peterson, Sturgeon Bay, Wis.
Str. Irene, George W. Jackson, Chicago, Ill.
Gas. Irving, A. B. Ballou, Chicago, Ill.
Str. Italia, John J. Boland & Co., Buffalo, N. Y.
Tug Jackson, Rose, Great Lakes Dredge & Dock Co., Chicago, Ill.
Gas. Juanita, Charles A. Burton, Chicago, Ill.
Gas. Kid, George Parkinson, Chicago, Ill.
Str. Kittie D., William Voetsch Jr., Edgewater, N. Y.
Sch. Lake Forest, Christ Nerdrum, Milwaukee, Wis.
Str. Lamb, C. H., John Kelting, Toledo, O.
Sch. Lester, T. G., Butler Bros. & Hoff Co., Detroit, Mich.
Tug Tillie and May, William Wood, Cleveland, O.
Str. Little Albert, W. E. Baldwin, Buffalo, N. Y.
Sch. Luckey, A. W., Torkil T. Lindal, Chicago, Ill.
H. B. Lysander, Charles Capron, Clayton, N. Y.
Str. McCormick, Walter V. Metcalf, Cleveland, O.
Tug McLean, Andrew A., William H. Sharp, Bay City, Mich.
Sch. Magil, C. J., William H. Ellery, Detroit, Mich.

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Str. Maine, S. C. McLouth, Marine City, Mich.
Str. Major, Peter B. Colgan, Dunkirk, N. Y.
Str. Major, W. H. Gratwick, Buffalo, N. Y.
Str. Mann, Mary, Jacob. W. Mann, Duluth, Minn.
Ltr. Mansfield, Ironville Dock & Coal Co., Cleveland, O.
Tug Martin, James H., L. E. Welch, Sheboygan, Mich.
Sty. Mary, Austin Harrington, Holland, Mich.
Tug Mary and Norman, Thomas J. Welsh, Erie, Pa.
Sch. Mary L., Hulda Braunsdorf, Claybanks, Wis.
Gas. Maryette, Joseph F. Fink, Chicago, Ill.
Str. Maryland, H. R. Spencer, Duluth, Minn.
Str. Mascot, Ignatz Selin, Milwaukee, Wis.
Str. Massassauga, Charles La Point, Buffalo, N. Y.
Str. Mercur, Fred, George Hall Coal Co., Ogdensburg, N. Y.
Str. Messenger, John Kelting, Toledo, O.
Gas. Midway, E. P. Rector, Port Peninsula, N. Y.
Sly. Minx, Walter H. Oades, Detroit, Mich.
Tug Monitor, St. Lawrence River Power Boat Co., Massena, N. Y.
Gas. Monitor, Michael Bohn, Racine, Wis.
Sch. Mowatt, James, Richard F. Squires, Marine City, Mich.
Str. Muskegon, A. T. Lindermann, Muskegon, Mich.
Str. Myrtle, W. B. Chapin, Cheboygan, Mich.
Sch. Mystery, W. W. Mumo. Gibralter, Mich.
Gyt. Nanine, J. S. Bastar, Chicago, Ill.
Sch. Nau, Libbie, Peter Halvorsen, Chicago, Ill.
Tug Navagh, John, R. B. Knox, Duluth, Minn.
Str. Nellie H., L. Gibenschau, Manistique, Mich.
Str. New York, Phoenix Steamship Co., Duluth, Minn.
Str. Niko, Frank E. Willard, Chicago, Ill.
Str. Oden, James Magee, Duluth, Minn.
Tug Ogontz, M. R. Pickands, Cheboygan, Mich.
Tug Osborne, Chase S., First National Bank, Detroit, Mich.
Str. Pabst, Fred, Reid Wrecking Co., Sarnia, Ont.
Sch. Paige, S. B., Alfred W. Graham, Fish Creek, Wis.
Str. Pennsylvania, Ogdensburg Coal & Towing Co., Ogdensburg, N. Y.
Str. Pentland, Joseph C. Ford, Fruitport, Mich.
Nas. Perhaps, Walter H. Singer, Duluth, Minn.
Str. Perry, Frank, George Kemp, Sault Ste. Marie, Mich.
Sch. Peterson, A. M., Frank E. Willard, Chicago, Ill.
Sch. Petrel, Theodore Nelson, Sheboygan, Wis.
Str. Pickands, H. S., George B. Taylor, Erie, Pa.
Tug Pioneer, M. R. Pickands, Charlevoix, Mich.
Str. Plankinton, John, George B. Taylor, Erie, Pa.
Str. Plow Boy, M. A. Johnson. Ashland, Wis.
Sch. Pomeroy, S. B., J. R. Gillingham, Bay Port, Mich.
Tug Pup, M. Green, Charlevoix Mich.
Sch. Queen, John L. Clyde, Buffalo, N. Y.
Tug Queen City, W. J. Hingston, Buffalo, N. Y.
Sch. Quickstep, James Erickson, Milwaukee, Wis.
Tug Rainbow, Charles A. Mattison, Vermillion, Ohio.
Str. Reliable, Thomas Isabell, Sturgeon Bay, Wis.
Str. Rietz, Charles, Lake & River Sand Co., Cleveland, O.
Tug Rogers, George, N. W. Hain. Dollar Bay, Wis.
Sch. Romeo, Hiram W. Smith, Buffalo, N. Y. Formerly Tailor.
Str. Rose, Fannie M., P. F. Lardie, Mapleton, Mich.
Sch. Rosebud, John Devine Jr., Sturgeon Bay, Wis.
Str. Rudolph, William, Charles B. Moiles, Saginaw, Mich.
Str. Russia, Phoenix Steamboat Co., Duluth, Minn.
Sch. Ryan, Joseph E. Ryan, Buffalo, N. Y.
Str. Sage, Russell, George C. Bayliss, Binghamton, N. Y.
Str. Saginaw, Frank S. Upton, Charlotte, N. Y.
Scv. Sallie, William Savidge, Spring Lake, Mich.
Sch. Schlitz, Globe, Harry R. Bestal, Chicago, Ill.
Str. Sea Fox, N. Dues, Cheboygan, Mich.
Str. Seymour, R. A. Jr., Chicago Lighterage Co., Chicago, Ill.
Tug Silver Spray, Mrs. Eva Shaw, Erie, Pa.
Str. Sirius, Weston U. Cline, Massena, N. Y.
Gap. Skidoo, A. Van Duren, Holland, Mich.
Tug Smith, John, Axel B. Dahlmer, Brunswick, N. Y.
Tug Smith, Peter, J. L. Crosthwaite, Buffalo, N. Y.
Str. Soper, Albert, Winaud Schlosser, Milwaukee, Wis.
Tug Sport, Warren A. Cartier, Ludington, Mich.
Tug Stevens, Ida M., Roy Love, Muskegon, Mich.
Sch. Tabor, Horace, F. R. Barnhardt, Chicago, Ill.
Str. Tempest, John H. Walther, Bay City, Mich.
Str. Tempest, William Jenery, Duluth, Minn.
Tug Tessler, A. A. C., John Hollander, Port Washington, Wis.
Str. Theresa, George Tryon, Eureka, Wis.
Sch. Thomas, Robert, Stewart Kingston, Bay City, Mich.
Str. Thompson, E. E., Fred Eber, Tonawanda, N. Y.
Tug Thompson, Thomas, Nels Olsen, Menominee, Mich.
Str. Topeka, The Topeka Co., Milwaukee, Wis.
Str. Tourist, W. W. Preston, St. Joseph, Mich.
Sch. Twin Sisters, M. J. Galvin, Buffalo, N. Y.
Sch. Two Kitties, Fred L. Furtaw, Bay City, Mich.
Sty. Uarda, Syd Scott, Mt. Clemens, Mich.
Sch. Uranus, George W. Carman, Marine City, Mich.
Tug Valiant, Herbert J. Knight, Erie, Pa.
Tug Van Ells, H. M., Carrie Geiken, Charlevoix, Mich.
Sty. Vita, Frank S. Upton, Charlotte, N. Y.
Tug Walker, T. B., Arthur Wilson, Erie, Pa.
Str. Wallace, Bertha, F. G. Schau, Port Clinton, O.
Str. Walsh, Lizzie, R. J. Ferris, Spring Lake, Mich.
Str. Walter J., Alice May Westfall, Port Byron, N. Y.
Str. Ward, Eber, Hecla Tranps. Co., Bay City, Mich.
Gas. Watanna, William Wiedeman, Toledo, O.
Sch. Weaver, Jennie, John A. Morley, Harbor Beach, Mich.
Tug Weidemann, R. H., H. R. Spencer, Duluth, Minn.
Str. Westcott, J. W., R. P. Thompson, Port Huron, Mich.
Str. White Wings, Edward Wilson, Michillinda, Mich.
Tug Will and Harry, Conrad Bachmann, Vermillion, O.
Tug Williams, J. L., E. F. England, Duluth, Minn.
Str. Willow, Stephen Jones, Chicago, Ill.
Str. Wilson, Mathew, Dennis McMillan, Muskegon, Mich.
Gas. Winneconne, W. J. Johnston, Butte des Mortes, Wis.
Sch. York State, Chicago Lighterage Co., Chicago, Ill.

LAKE VESSELS SOLD TO CANADIANS.

Sch. Andrews, Abbie L., Pittsburg & Erie Coal Co., Toronto, Ont.
Sch. Bradshaw, Mabel, Herbert Cleland, Collingwood, Ont., name changed to Soo City.
Str. City of Grand Rapids, Capt. Will Reid, Sarnia, Ont.
Str. Florence B., Great Lakes Dredging Co., Port Arthur, Ont.
Sch. Ford River, H. W. Richardson, Kingston, Ont.
Str. Franklin, Gen. W. B., Peter Cavanagh, Ont., name changed to Arrah Wanna.
Sch. Herschel, Peninsula Tug & Towing Co., Wiarton, Ont.
Sch. Hutt, Hattie, Frank Granville, Chatham, Ont.
Str. Iroquois, Montreal Transportation Co., Ltd., Montreal, Can., name changed to Windsor.
Str. James, Henry R., John S. Thom, Quebec, Can.
Tug Owen, Capt. Fred Trotter, Amherstburg, Ont.
Str. Pabst, Fred L., Reid Wrecking Co., Sarnia, Ont.
Sch. Sands, Isabella, John Harkins and William Kennedy, Sarnia, Ont.
Str. Tecumseh, Tutheway & Sons, Goderich, Ont.
Str. Vernon, Jr., William H. Comstock, Brockville, Ont.
Str. Whitney, D. C., Ganley, Sault Ste. Marie, Ont.

CONCRETE BOATS.

An Italian correspondent of the *London Times* predicts that the use of concrete in boat building will largely take the place of iron and steel. He says:

Large boats of reinforced concrete have been built already in this country, and five of these, of 120 ton and more, were on commission for the Italian navy. The first of these boats, a 120-ton barge, was built in 1906, on the plans of Mr. Gabellini, an Italian who has given his whole attention to reinforced concrete, and who for many years has been conducting experiments with this class of material. This boat, which was built with double bottom and of the cellular type, was submitted to severe tests in the Spezia arsenal, where a much larger boat built of iron and with an iron ram was directed against it without producing any considerable damage to it. After some time, and in consequence of the satisfactory results given by this first boat, four more of these barges were ordered on account of the Italian navy. It is my opinion that owing to the unfavorable conditions of Italy as an iron producing country the problem of reinforced concrete for ships will meet with a good deal of attention here, and that experiments and trials on a much larger and more important scale will shortly be conducted.

RAILROAD RATE.

Apparently the railroads are beginning a propaganda upon the reasonableness of freight charges through the medium of a series of postal cards. The contention is that the freight charge is so small that it cuts no figure whatever in the retail unit and therefore is not a factor in the higher prices for commodities so obtaining. Apparently the published tariff bears this out. An excerpt is given from a lecture on "The Freight Rate Structure," by Logan G. McPherson, lecturer on transportation at Johns Hopkins University. He says:

"The transportation charge on the material entering into a pair of shoes made in a St. Louis factory averages one and one-quarter cent. The transportation charge, to place that pair in the hands of a consumer in any part of the United States is about equal to the postage on an ordinary letter. An ordinary bed that retails at St. Louis at $8, for example, will have paid the railroads about 40 cents. From 10 pounds of nails made in Pittsburg the railroads will have obtained a trifle over two cents, and from 10 pounds of wire two and one-half cents. An axe made in the Pittsburg district that retails in St. Louis for $1, will have paid the railroad one and one-quarter cents. The freight on a dozen eggs for 1,000 miles is less than the postage of a letter, and a pound of Wisconsin butter may be sent to New England or New York for half the cost that the bill for it would go by mail. Poultry

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from Texas for less than a cent and a half a pound; beef from western ranges at less than a cent a pound."

WARSHIP ORDERS FROM RUSSIA.

Birmingham, Eng., May 18.—A welcome item of news comes from Russia to the effect that the Russian government are ordering from the Clyde ship builders five ironclads to exceed the tonnage of the Dreadnought. Shipbuilding orders are badly wanted for during the first quarter the tonnage under construction in the yards of the Glasgow district was only 170,543 as compared with 275,088 for the corresponding date of last year. This lack of orders has caused great stagnation in the plate and angle mills of the district.

Among ship builders a good deal of attention is being devoted to the new torpedo boat destroyer Swift, which is being completed at the yard of Messrs. Cammell, Laird & Co., Birkenhead. The boat is much the largest ever built of this class, her length being 345 ft., compared with 270 in the Tartar, and has a displacement of 1,830 compared with 800. Her speed will be 36 knots, and in respect of armour she will be a powerful fighting ship. Seven more vessels of the same class are being built, and a special feature is that they are to be propelled by oil fuel. The Swift is estimated to cost £247,462, and she will be driven by turbine machinery. Her share in actual warfare will probably be not so much in the capacity of destroyer as in that of scout at the service of the admiral.

Messrs. Cammell, Laird & Co. are also building for the National Steamship Co., of Peru, a couple of fast turbine steamers for service on the west coast of South America. They are magnificently fitted, and their speed will enable passengers to travel from Lima to London via New York in a little over three weeks. The firm has been successful in getting a series of most important ship building contracts.

The steamer Samuel Mitchell, which struck at Houghton Point, made temporary repairs at Ashland. The schooner Chickamauga, which struck the Mitchell after the steamer grounded, left Ashland in tow of the steamer D. Z. Norton.

Repairs on the steamer John Stanton, which struck in the channel at Houghton, will cost about $10,000.

OBITUARY.

Capt. Samuel Samuels, one of the most noted of American navigators, died at his apartments in Brooklyn at the great age of 85 years last week. Capt. Samuels achieved the distinction of driving the full-rigged ship Dreadnaught from Queenstown to Sandy Hook in nine days and 17 hours, a record which never has been and probably never will be equalled under canvas.

He began his seafaring life at the age of 11, running away from an unpleasant stepmother in Philadelphia and shipping as cabin boy on the steamer Hampton Westcott. He served in many a vessel until a syndicate of New York merchants built the Dreadnaught for him at Newburyport, Mass. This famous ship was built to be driven in a gale of wind for in light winds she was not fast. Many a time the crews of other vessels, hove to in heavy weather, could see the keel of the Dreadnaught as she jumped from sea to sea under every stitch of canvas that she could carry. During her career she was known as the wild boat of the Atlantic. Capt. Samuels achieved his notable triumph with this vessel by driving her at full speed during the 24 hours of the day. He used to say that anybody could sail a vessel in daylight and therefore he invariably stood his watch at night. In his book entitled "From Forecastle to Cabin," published by Harper & Bros., he details the story of his early life. In 1878 he was appointed general superintendent of the Pacific Mail Steamship Co., of San Francisco, and in 1881 organized the United States Heating & Power Co. in New York. In 1889 he founded the *Marine Journal* and was its president at the time of his death.

SHIP BUILDING DURING APRIL.

The bureau of navigation reports 114 vessels of 63,176 gross tons were built in the United States and officially numbered during April, 1908, as follows:

	WOOD				STEEL				TOTAL	
	Sail		Steam		Sail		Steam			
	No.	Gross	No.	Gross	No.	Gross	No.	Gross	No.	Gross
Atlantic and Gulf	5	3,352	32	2,189	....	.....	2	11,833	39	17,374
Porto Rico	....	.....	....	.....	....	.....	....	.....	....	.....
Pacific	3	39	34	4,311	..	.....	5	9,826	42	14,176
Hawaii	1	34	....	.....	..	.....	..	.....	1	34
Great Lakes	....	.....	3	28	....	.....	9	30,558	12	30,586
Western Rivers	....	.....	20	1,006	....	.....	....	.....	20	1,006
Total	9	3,425	89	7,534	..	.....	16	52,217	114	63,176

COLLIER VESTAL LAUNCHED.

The new collier Vestal building at the New York navy yard for the navy department was launched last week. The collier is 465 ft. 9 in. over all, 450 ft. keel, 60 ft. beam and 38 ft. 6 in. deep. The mean load draught is 26 ft. displacing 12,500 tons. Her dead weight cargo capacity is 6,000 tons and her bunker capacity 1,576 tons. She is designed to maintain a speed of 16 knots an hour and will cost when finished $1,400,000. It would be interesting to discover what in actual practice will the cost per ton of carrying coal in her.

AROUND THE GREAT LAKES.

Butler Bros., Huff & Co., contractors of the Michigan Central tunnel of Detroit, have purchased the barge Favorite from F. H. Riebenach and intend to use it for lightering and storage purposes.

President Livingstone announces that acetylene gas lamps have been set at the Limekiln Crossing at the north and south ends of the east side. They are red flash lights which are lighted two seconds and dark one second.

The Detroit & Buffalo Steamboat Co. has just issued a card announcing its service between Detroit and Buffalo. This is one of the most agreeable trips on the lakes. Railroad tickets are accepted for transportation on these boats.

The fuel scow Lorain, building for the Lorain Coal & Dock Co., was recently launched at the Cleveland yard of the American Ship Building Co. with more elaborate ceremonies than have latterly attended the putting overboard of passenger and freight steamers. The scow was christened by Miss Frances Johnson, of Columbus, daughter of the president of the Lorain Coal & Dock Co. The launching was witnessed by quite a delegation from Lorain who were later entertained by the ship building company.

J. Pierpont Morgan's old yacht Corsair, purchased by the American government before the Spanish-American war and renamed the Scorpion, will be placed at the service of the Duluth naval reserves this summer.

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DEFEAT OF OCEAN MAIL ACT.

Every man in the middle west who desires to see his country's flag advanced on the ocean and his country's trade expanded to foreign lands, will note with pride and gratitude that not one vote from Michigan and only one vote from Ohio was cast on May 23 against the ocean mail bill of President Roosevelt and Secretaries Taft and Root. But it is with very keen regret and disappointment that we observe that the opposition to this measure was led and the principal speech against it delivered by one of the Cleveland representatives of congress, Hon. Theodore E. Burton. The national administration and the Republican leaders in congress believe that Mr. Burton defeated this bill by siding with the Democrats and leading about 30 middle western Republicans who voted against it, thus striking the ocean mail provision out of the postoffice appropriation bill by the close vote of 145 to 153.

President Roosevelt has recommended this measure again and again to congress, and Secretary Root has advocated it in public addresses since his return from South America. Secretary Taft has again and again in speeches at Chicago and elsewhere urged that this specific ocean mail legislation be enacted. The middle west, like the rest of the manufacturing and commercial sections of the country, approves this legislation, and Mr. Burton in taking his stand of implacable hostility to this and apparently every measure for the extension of our ocean mail service and the upbuilding of an auxiliary navy has gone flatly against the desires and the interests of a very great majority of his constituents.

Yet, though halted by this adverse vote of last week in the house of representatives, the national movement for swift and regular postal communication with South America and the great countries across the Pacific ocean, is absolutely certain to succeed. It will be a great deal stronger at the next session of congress than it has been at this one. It will command the support of many middle western representatives who though favoring the legislation themselves, hesitated now to support it because they believed it was not understood by their people, and could not be adequately explained to them before next autumn's critical election. The Gallinger ocean mail bill, as passed on March 20 by the senate, has not been considered by the house committee on postoffice and post roads. The parliamentary course is clear to have this bill taken up in the committee, reported to the house and passed at the next or shorter session of the present congress, opening next December. Having been passed by the senate the Gallinger bill retains its vitality and can be enacted at any time before March 3, 1909.

The real and great progress which the merchant marine is making in congress is indicated by the fact that even at this unfavorable time and in the face of the bitter attack on Mr. Burton, not only all of the Ohio representatives and all of the Michigan men, but all of two of the Indiana Republicans, half of those of Illinois, half of those of Kansas, half those of Nebraska, and nearly half those of Minnesota voted in favor of this bill on May 23. And two Democrats of strength and influence, Mr. Hobson, of Alabama, and Mr. Jones, of Virginia, voted for the bill, thus bringing measurably near the time when this issue of the merchant marine shall be regarded as a national and not a party question.

Therefore, the regret must be all the greater that Mr. Burton saw fit to throw his power in the house against this legislation, though his party in both nation and state has repeatedly resolved in favor of it, and it is generally believed in by his own constituents regardless of political affiliations. The enactment of the ocean mail bill at this time would have had a most beneficent effect upon our important steel and other manufacturing industries. It would have led to the building of large steamships of high power and speed, valuable for commerce in peace and for auxiliary naval service in war. It would have helped to bring the country out of the business depression from which it is emerging. It would have increased the country's trade and given work and wages to thousands of toilers who may now be idle because this measure did not pass. Yet President Roosevelt and Secretaries Taft and Root are intent upon the success of this legislation, and we have no doubt that even in spite of Mr. Burton's opposition they will succeed in the next session of congress.

LAKE SITUATION.

The ore trade is as deep in the dumps as it has been at any time during the year and it requires a most optimistic and sanguine temperament to see any immediate change. The movement of ore to June 1 will be nil, probably not over 250,000 tons, and even this would not have been

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moved were not certain mixtures necessary. H. S. Wilkinson, chairman of the vessel owners' committee, has called another meeting of vessel owners to be held in Cleveland on Monday next. At the last meeting of this committee it was decided not to make a general start until June 1. It is quite certain that at this meeting the general start will be delayed until June 15 and it may be further postponed until July 1. The fact is that there is no demand for tonnage in the ore trade. The big carriers that were compelled under their contracts to take up coal have returned to Lake Erie light, no ore offering and the grain trade being entirely absorbed by the line boats.

A few cargoes have arrived at Lake Erie ports in Pittsburg Steamship Co.'s ships to meet the Steel Corporation's requirements, but the sum total is of no consequence. The movement of ore up to June 1 of last year was 6,252,260 tons, which may be regarded as 1908's handicap to date. Last year over 6,000,000 tons were moved in each of the months of June, August, September and October, July falling somewhat behind owing to the miners' strike.

If the opening of navigation is delayed until July 1, which seems probable, the season thereafter is likely to be a normal one with a movement somewhere between 5,000,000 and 6,000,000 tons for the four months following. There is little likelihood that the steel-making companies will permit the movement to fall much below 25,000,000 tons, certainly not below 20,000,000 tons. Ordinary business precaution will require that an ample reserve be retained.

The coal trade is improving somewhat, offerings of small cargoes being plentiful.

PIG IRON SITUATION.

Great activity continues in the pig iron market, with a large volume of inquiries and many sales of moderate tonnage aggregating a large total. Following the heavy buying by large interests, smaller consumers in considerable numbers have come into the market and placed orders freely. Of course, it is unquestionably true that there is considerable placing of orders through a desire to speculate. On the other hand, there is substantial evidence of increased melt and better feeling throughout the country. It seems that $11.50, Birmingham, is now the bottom price for southern pig. Sime northern interests have advanced the price of basic to $16, valley, about $1 above recent quotations. Improvement in the coke market continues. Some furnaces have contracted for their requirements for the last half of the year, and a number of others are in the market. Foundry coke, especially at Chicago and St. Louis, is in demand. The finished material market is quiet. An open market for bar iron in the east has been declared, but manufacturers are acting in harmony and better conditions are expected. Fair tonnages of structural material have been ordered in the central west and in the east.

BLOW TO AMERICAN SHIPPING.

The friends of American shipping throughout the United States were profoundly disappointed by the action of the house of representatives in failing to concur in the senate amendment to the postoffice appropriation bill. Senator Gallinger's bill to extend the provisions of the ocean mail act of 1891 to embrace projected lines to South America, to the Philippines, to Japan, to China and to Australasia had passed the senate, but a similar measure introduced in the house failed to secure the endorsement of the committee on postoffices and post roads and was therefore not submitted to the house at all for vote. Thereupon, in order to bring it to a vote, Senator Gallinger caused the postoffice appropriation bill to be amended in the senate to embrace the act already passed by it. The conference committee of both houses agreed to this amendment to the postoffice appropriation bill and it was so reported to the house. The house, however, rejected it by a majority of a few votes, but the senate stood firm and refused to recede from its position. The general subject was debated on the following day, but was defeated by the defection of a small coterie of Republicans led by T. E. Burton, chairman of the committee on rivers and harbors. The active opposition of Mr. Burton was something of a surprise, for while he never has been friendly, it was not expected that he would engage in active opposition. His opposition was, however, determined and active. Had it not been for it the bill probably would have passed, because in spite of it the measure received two votes more than on the preceding day.

The defeat of this entirely reasonable proposition is a great disappointment. Had it passed it doubtless would have resulted in the placing of immediate contracts with ship yards for new ships and would have done much to revive the steel industry which is now languishing.

LAKE LAUNCHINGS.

The bulk freighter Price McKinney, building for J. J. Rardon, of Chicago, was launched from the Lorain yard of the American Ship Building Co. on Saturday and was christened by Miss Grace Rardon in honor of her father.

The McKinney is 452 ft. over all, 432 ft. keel, 52 ft. beam and 28 ft. deep. She has 12 hatches spaced 24-ft. centers. Her engines are triple-expansion with cylinders 22, 35 and 58-in. diameters by 42-in. stroke, supplied with steam from two Scotch boilers, 13 ft. 9 in. by 11 ft. 6 in., equipped with Ellis & Eaves draft and allowed 180 lbs. pressure. She will carry 7,500 gross tons.

Among those attending the launching were James Corrigan, Price McKinney, M. A. Bradley, W. W. Patterson, O. N. Steele, John A. Donaldson, Capt. J. W. Ryan, all of Cleveland, and John Weisbeck, of Buffalo. The McKinney will be commanded by Capt. E. C. Van Patten and her chief engineer will be W. D. Walter.

This makes seven freighters that have been launched from the Lorain yard since the first of the year.

The bulk freighter J. F. Durston was launched from the Superior yard of the American Ship Building Co. on Saturday last and was christened by Mrs. Ward Ames Jr., of Duluth. The Durston is building for the Wilkinson Transportation Co. and is 452 ft. over all, 432 ft. keel, 52 ft. beam and 28 ft. deep, having 23 hatches spaced 12-ft. centers. Her engines are triple-expansion with cylinders 22, 35 and 58-in. diameters by 42-in. stroke, supplied with two Scotch boilers, 13 ft. 9 in. by 11 ft. 6 in., equipped with Ellis & Eaves draft and allowed 170 lbs. pressure. She will carry 7,500 gross tons.

AROUND THE GREAT LAKES.

The ship builders of the Pacific coast have been invited to submit bids on steel artillery tenders for the United States government to be 98 ft. over all, 91 ft. 4 in. keel, 22 ft. beam and 11 ft. deep.

E. Foster has been elected general manager of the Chesapeake Steamship Co. He has been connected with the company for 26 years in various capacities.

It is reported that the Alaska Steamship Co. intends to build two new steamers for its Seattle-Alaska trade.

The schooner D. K. Clint brought $2,200 at United States marshal's sale at Detroit this week. She was purchased by Fritz Riebenach, of Alpena.

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APPOINTMENTS OF MASTERS AND ENGINEERS

GILCHRIST TRANSPORTATION CO., CLEVELAND, O.

		CAPTAIN.	ENGINEER.
Str.	City of Genoa	A. D. Vorce	Walter Patterson
"	City of Naples	D. B. Elsey	Lewis Fittinger
"	City of Rome	C. S. Ellis	Marcus Hill
"	Colonial	L. J. Lavely	Carl Becker
"	Cumberland	W. S. Ritchie	William J. Nolan
"	C. A. Eddy	William Morrison	William Stroble
"	C. W. Elphicke	G. Atkinson	Peter Britz
"	Gen. Garretson	C. T. Gunderson	A. F. Hogle
"	Gilchrist	Stanton Markle	D. M. Foster
"	J. C. Gilchrist	A. M. Shepard	John Parks
"	F. W. Gilchrist	Charles Hinslea	Henry Jesson
"	C. C. Hand	T. J. Moran	F. O. Burrows
"	John Harper	L. Miskin	A. L. Millet
"	F. W. Hart	R. J. Walder	C. J. Erickson
"	F. J. Hecker	H. M. Clark	A. L. Hatch
"	Helena	George Dupuie	William Sicken
"	Hiawatha	R. H. Sturtridge	C. T. Martin
"	R. L. Ireland	J. P. Minskey	James Balfour
"	Jupiter	J. B. Lyons	T. F. Higgins
"	Lake Shore	Duncan Buie	George Zanger
"	Lansing	R. Recor	J. R. Engert
"	Mars	John Smith	Porter Robertson
"	H. P. McIntosh	E. L. Ennes	H. L. Mitchell
"	Massachusetts	George T. Inman	Marcus M. Barns
"	Thomas Maytham	B. F. Ogden	Daniel Flint
"	Mecosta	W. H. Stern	Nelson Lockhart
"	Merida	M. J. Madden	Charles Burns
"	Merrimac	G. A. MacAulay	Gordon Potter
"	Neosho	Andrew Cowie	Calvin Hatch
"	Neptune	C. C. Stewart	Otto Elsholz
"	Neshoto	Arnold Evanson	August Dumar
"	E. W. Oglebay	Nelson Brown	Thomas Harringer
"	Olympia	A. Perreault	Peter Lamar
"	F. M. Osborne	F. A. Dupuy	William Brake
"	R. R. Rhodes	J. F. Mackin	Guy Squire
"	G. H. Russel	Charles Hahn	John Mahar
"	E. N. Saunders	Pierre Bouille	Martin Mitchell
"	Saturn	A. W. Holmes	D. T. Brown
"	R. E. Schuck	G. L. Cudeback	Joseph Berney
"	John Sherwin	F. A. Goodell	T. A. Francombe
"	H. S. Sill	Alex Clarke	Thomas Burns
"	Steel King	W. F. Delaney	Bert Beauchamp
"	Tacoma	John Lohr	Peter Robertson
"	C. Tower	F. S. Ellis	E. Ellsworth
"	Uranus	Charles Caughell	T. F. Birch
"	Venus	Frank Ott	John Conley
"	Vermillion	Hugh McCann	George B. Eaton
"	Volunteer	Richard Call	H. B. Barden
"	Vulcan	James Bucanan	Robert Dornan
"	P. G. Walker	Ben Moshier	John Seymour
"	Wallula	W. N. Borthwick	Thomas Morrill
"	C. W. Watson	Ed Mooney	L. J. Mannion
"	J. D. Weeks	Peter Full	R. H. Reynolds
"	D. M. Whitney	W. C. Butts	C. A. Francombe
"	George F. Williams	Paul Gutch	Harry Stone
"	J. B. Wood	J. C. Byers	John Fritz
"	Lewis Woodruff	Thomas Gibson	A. MacLaren
"	A. P. Wright	B. McGregor	August Lembke
Bge.	Antrim	F. E. Johnson	Wm. Marshall
"	Magnetic	S. Minskey	
"	Tyrone	R. E. Johnson	

CANADIAN LAKE TRANSPORTATION CO., LTD., TORONTO, ONT.

		CAPTAIN.	ENGINEER.
Str.	Kenora	F. L. Stephen	William Byers
"	Regina	Peter McKay	C. J. McSorley
"	Wabana	———	Robert W. Ross
"	Corunna	W. H. Brian	H. McDonald
"	Nevada	J. Cavanagh	William Linton

DUNKLEY-WILLIAMS CO., CHICAGO, ILL.

Str.	City of South Haven	F. A. Dority	Mike Madden
"	Petoskey	J. M. Mitchell	J. Hanke

C. W. ELPHICKE & CO., CHICAGO, ILL.

Str.	Mary C. Elphicke	Joseph Matthews	Edw. Donaldson
"	William L. Brown	Samuel Sexsmith	D. W. Rice
"	G. Watson French	W. W. Eger	Walter Farr
"	John Mitchell	John Massey	S. C. Davis
"	Ogli	W. T. Sutherland	F. T. Everill
"	Phenix	Thomas J. Higgins	William Frazier

LUSITANIA BREAKS ALL RECORDS.

The Cunard turbine liner Lusitania on her latest westward trip smashed all records from Daunt's Rock to Sandy Hook, even eclipsing her sister, the Mauretania, which is generally regarded as the faster of the two. The Lusitania had Daunt's Rock abeam at 11:35 A. M. Sunday and passed the Sandy Hook lightship at 2.55 A. M. Saturday, making the trip in four days, 20 hours and 22 minutes, the hourly average being 24.83 knots. Incidentally she smashed all records by the way, not only for the fastest voyage, highest average, but greatest daily speed as well. On Wednesday she made 632 knots, surpassing by five knots the previous record of 627 knots, her hourly average for this day being 26 1/3 knots. Had it not been for a fog which piled up on the last day the Lusitania would have averaged 25 knots across the ocean, but fog overtook her and Capt. Watt was compelled to slow down. The fog was a bitter disappointment to the Cunard Co.

IMPROVEMENT OF RIVERS AND HARBORS.

The members of the National Rivers anl Harbors Congress gave a dinner at the Hotel Astor in New York last week to a number of newspaper and magazine men in pursuance of the policy of that organization to awaken public sentiment to the need of concerted action in the development of rivers and harbors. Congressman Joseph E. Ransdell presided. The principal speaker was Congressman E. C. Ellis of Kansas City, who has a bill before the present congress for the establishment of a separate department for the completion and improvement of waterways. He said in part:

"The lack of a national policy has been the cause of the opposition of waterway appropriations. It accounts for the criticism which has manifested itself in certain quarters at intervals. There have been two pronouncements, and two only, by the two great political parties respecting the nation's waterways. The Republican party put a plank in its first national platform advocating improvements on a national scale of rivers and harbors. The Democratic party put a similar plank in its last national platform. Neither party has ever really championed the cause of our waterways. Neither party has ever appealed to the people in their behalf.

"Again, so far as inland waterways are concerned, little, very little, has been done hitherto which has had the

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effect of converting general or national benefits. A few great industries have been built up and have assumed magnificent proportions. Reduction in transportation rates have been effected within an area; but the area of this great industrial growth, the area of increased commerce and reduced freight rates, is comparatively small. The beneficial zone round about the Great Lakes is relatively narrow. It is true that the farmers up in the northwest can send their grain to the seaboard for about one-sixth the cost which prevailed before lake shipments were possible. But my point is, that this high privilege belongs to the farmers of a relatively small area of grain production. The grain growers of Kansas, Oklahoma and Nebraska are without the pale of those benefits."

BOSTON MARINE NOTES.

Boston, May 27.—Rear Admiral Swift, commandant of the Boston navy yard, is in receipt of a notice from the navy department at Washington forbidding political activity on the part of navy yard employes, and any employe violating the rule will be subject to immediate discharge. The letter is as follows:

"Sir—Laborers and mechanics at the yard or station under your command will be subjected to discharge for political activity, in the same manner as competitive classified employes.

"You will post copies of this order in conspicuous places in your yard, together with copies of department circular letter of Oct. 12, 1907, and department order 62, of March 28, 1908. TRUMAN H. NEWBERRY."

The circular letter and previous order referred to covers practically the same ground as the new order.

It is reported that a Halifax company will have built a steam trawler much the same as the Boston steam trawler Spray built by the Fore River Ship Building Co. The Spray has been a financial success and it is this probably that has led to the proposed enterprise.

A new light tender is to be built for the first lighthouse district, which takes in the Maine coast, to take the place the Geranium and the Lilac, for which $200,000 has been set aside. The new boat is to be of steel and modern in every respect.

The barge Ashland, which struck on a ledge in the river near Bath, Me.,

THE IMPERIAL OIL CO., SARNIA, ONT.

		CAPTAIN.	ENGINEER.
Str.	Imperial	Lachlan Morrison	William Tweedy

CEDAR POINT RESORT CO., G. A. BOECKLING, MGR., SANDUSKY, O.

		CAPTAIN.	ENGINEER.
Str.	R. B. Hayes	Henry J. Witcher	Adolph Stein
"	A. Wehrle, Jr.	———	———
"	New York	———	———

HERBERT CLELAND, COLLINGWOOD, ONT., CAN.

Str.	Soo City	H. Cleland	Donald Fraser

R. J. FERRIS, GRAND RAPIDS, MICH.

Str.	Lizzie Walsh	M. H. McClure	Milo Flanders

KINGSTON SHIPPING CO., LTD., KINGSTON, ONT.

Str.	Prince Rupert	A. H. Malone	Robert Veech

JULIUS KROOS, SHEBOYGAN, WIS.

Str.	Susie Chipman	N. A. Gunderson	Jas. Teser

MARINE TRANSIT CO., MARINE CITY, MICH.

Str.	Toltec	James Taylor	Joseph Valley

MERCHANTS LINE, J. G. E. JACQUES & CO., MRGS., MONTREAL, CAN.

Str.	City of Montreal	A. Lefebvre	F. Hamelin
"	Bickerdike	William D'Aoust	E. Hamelin
"	City of Ottawa	J. V. Trowell	William Kennedy

MILWAUKEE SAND & GRAVEL CO., MILWAUKEE, WIS.

Str.	Ellen	M. Dailey	Jul Schroeder
"	John Roberts	A. Warrender	F. Troegel

J. N. MULLEN, DETROIT, MICH.

Str.	Faustin	A. Schutte	Robert Craig

WILLIAM MUNROE, M. O., MUSKEGON, MICH.

Str.	George C. Markham	Henry Bennett	John Golden
Sch.	Lyman M. Davis	Hans Hermanson	

PHOENIX TRANSPORTATION CO., C. W. ELPHICKE & CO., MGRS., CHICAGO, ILL.

Str.	Phoenix	Thomas Higgins	William Frazier

POTTER, TEARE & CO., CLEVELAND, O.

Str.	Mary A. McGregor	Henry Brosk	William Griffith

RAINY RIVER NAVIGATION CO., LTD., KENORA, ONT.

Str.	Kenora	N. Richmond	James McRoberts

CAPT. J. E. RATHBUN, TRENTON, ONT.

Str.	Varuna	J. E. Rathbun	James Eldridge

JOHN W. ROBINSON, M. O., N. TONAWANDA, N. Y.

Str.	C. H. Green	C. E. Little	William Ormsby
Bge.	Genoa	D. C. Ryan	
"	Our Son	Michael T. Ryan	

SARNIA TRANSPORTATION CO., SARNIA, ONT., CAN.

Str.	Lake Michigan	Alex. McLellan	Harvey Myers
Bge.	Cyrenian	Martin Mahony	
"	Naiad	Murdoch McDonald	

H. L. SHAW, MGR., BAY CITY, MICH.

Str.	Milinokett	A. J. Mahon	E. A. Hoffman
"	City of Bangor	Forrest Maloney	William C. Anderson
"	Penobscot	M. H. Mahon	William P. Hoffman
"	Selwyn Eddy	A. M. Williams	Adam C. Lowe
"	E. C. Pope	Ray M. Leonard	William C. Houston

SHOAL WATER TRANSPORTATION CO., MT. CLEMENS, MICH.

Str.	Norwalk	Frank Goodrow	———

GEORGE B. TAYLOR, M. O., PITTSBURG & ERIE COAL CO., ERIE, PA.

Str.	P. D. Armour	J. O. Wood	A. C. Krogman
"	John Plankinton	F. Howe	J. B. Hart
"	R. P. Fitzgerald	P. J. O'Neil	Joseph Prevost
"	Wiley M. Egan	J. W. Kelley	A. W. Wilcox
"	H. S. Pickands	M. F. Morgan	Thomas Laberdee
"	Havana	S. M. Murphy	James R. Hurd
"	Business	J. R. Maitland	James Carter
"	Alcona	J. H. Warwick	James Murray
Bge.	Marengo	William McQuinn	
"	Edward Kelley	A. E. Bullock	

THOMSON LINE, CLEVELAND & OSCODA TRANSIT CO., DETROIT, MICH.

Str.	City of Holland	Robert Campbell	Henry Meno

THE VOLUNTEER TRANSIT CO., CLEVELAND, O.

Str.	Charles Beatty	Hugh McKinzie	Charles J. Snyder

THE WILSON TRANSIT CO., CLEVELAND, O.

Str.	J. E. Upson	J. S. Wood	Fred Harmon
"	Charles S. Hebard	W. W. Dawley	Frank C. Stoeber
"	Henry W. Oliver	C. H. Francke	Charles Annable
"	Capt. Thomas Wilson	Daniel Buie	W. E. Donovan
"	Andrew Carnegie	E. R. Morton	James F. Derrig
"	W. D. Rees	John Milne	Gilbert McPhail
"	Yuma	James Higgins	S. E. Mayberry

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COMSTOCK & SINCLAIR, DULUTH, MINN.

		CAPTAIN.	ENGINEER.
Str.	O. T. Flint	J. U. Sinclair	George H. Bowen
"	Simon Langell	Guy Geel	J. G. Fowler
Bge.	Arenac	R. G. Taylor	
"	W. K. Moore	Joseph Thody	
"	Interlaken	Burt Warwick	

FRANK GRANVILLE, CHATHAM, ONT.

Sch.	Hattie Hutt	Frank Granville	

GRAY TRANSPORTATION CO., CLEVELAND, O.

Str.	Arizona	W. R. Neal	———
Bge.	Scotia	Carl Jorgenson	
"	Plymouth	A. Bigger	

GREAT LAKES DREDGE, DOCK & CONSTRUCTION CO., CLEVELAND, O.

Tug	Welcome	Harry McDonough	George Page
Sch.	Baldwin	William Hammel	
"	Russian	William Bonfield	
Tug	Brogan	S. Lawson	William Sullivan
"	George T. Nelles	A. L. Roy	R. B. King
"	McCarthy	Tom Carey	William Wilkinson
"	R. C. Sullivan	Sherman S. Barnard	Charles Hunt
Str.	Alice G.	J. E. Grady	———
Tug	N. Stickney	William Clark	Joe Harmon
Str.	Rover	J. J. Mahony	———
Tug	Cooper	James LeClaire	M. McDonough

LAKE ERIE TRANSPORTATION CO., 24 WADE BLDG., CLEVELAND, O.

Str.	William S. Mack	G. E. Benham	O. J. McCabe
"	Pascal P. Pratt	W. E. Moore	F. E. Doyle

MUTUAL TRANSIT CO., BUFFALO, N. Y.

Str.	Northern Queen	W. H. Stevenson	P. J. McGinnis
"	Northern King	E. C. Leath	A. Naglevoort
"	North Star	D. L. Cartwright	W. T. Pike
"	Northern Light	S. B. Worden	Charles Ryan
"	North Wind	Thomas Stevenson	T. W. Jackman
"	Northern Wave	E. B. Blair	John J. Dee
"	Minneapolis	Walter Robinson	D. J. McMillan
"	St. Paul	Peter Thompson	Henry Stone
"	W. C. Rhodes	George B. Crawford	Guy Hemenger
"	Huron	Neil Anderson	Alex Adams

ONTARIO & QUEBEC NAVIGATION CO., LTD., PICTON, ONT., CAN.

Str.	Alexandria	E. B. Smith	T. J. S. Milne
St. Bge.	Lloyd S. Porter	M. Heffernan	Lew Smith
" "	Aberdeen	M. Hicks	———
" "	Reliance	William Dulmage	C. McWilliams
" "	Water Lily	N. Palmatier	C. Welsh

TONAWANDA BARGE LINE, N. TONAWANDA, N. Y.

Str.	F. R. Buell	C. W. Woodgrift	Thomas McLaughlin
Bge.	A. Stewart	F. Chamberlain	
"	Eleanor	F. Chamberlain	

TORONTO FERRY CO., LTD., TORONTO, ONT.

Str.	Bluebell	R. Williams	J. W. Astor
"	Mayflower	G. Moulton	I. Urquhart
"	Primrose	T. Jennings	W. M. McRoberts
"	Lily	W. Foster	James Lawrence
"	Island Queen	J. Tymon	H. Dawson
"	Kathleen	M. Osborne	C. Merrian
"	John Hanlan	W. Joyce	Julius Beyer
"	Ada Alice	H. McSherry	I. Thompson
"	Luella	J. McDonald	Thomas Whitty
"	Clark Bros.	I. Pratt	Joseph Payne

UNION STEAMBOAT LINE, BUFFALO, N. Y.

Str.	Starrucca	John C. Clarke	Alex A. Brown
"	Ramapo	John J. McDonald	H. Johnson
"	Chemung	J. R. Gebhard	Nels Johnson
"	Owego	George W. Moon	E. T. Jenkins
"	Tioga	C. W. Watson	W. A. Hayes
"	Binghamton	Sam Smith	John Caul

W. A. & A. H. HAWGOOD, CLEVELAND, O.

Str.	Bransford	M. A. Budd	John Norton
"	Harold B. Nye	Ralph Nutting	George H. Miller
"	J. M. Jenks	George Hayward	James M. Oag
"	Edwin F. Holmes	Joseph E. Mahon	Charles E. Timlick
"	Abraham Stearn	L. A. Rand	George Whitehead
"	Henry B. Smith	C. C. Balfour	Thomas Braund
"	Sheldon Parks	J. W. Montgomery	George Charlton
"	Salt Lake City	James Owen	John Chapman
"	W. A. Hawgood	W. J. Chamberlain	George Robin
"	A. H. Hawgood	H. S. Shackett	Alex Wilson
"	W. R. Woodford	William L. Montgomery	Henry Percival
"	H. A. Hawgood	C. D. Brown	Samuel Roswell
"	J. Q. Riddle	O. J. Solean	Frank C. Ellis
"	Harvey D. Goulder	George McGarry	William Stewart
"	Wisconsin	J. D. Greene	R. R. Buchanan
"	Umbria	George Robarge	Frank Randall
"	H. B. Hawgood	A. C. May	John Henkleman
"	S. S. Curry	James Connolly	William Lowe

a month ago, was floated May 21 by the tugs Confidence of Boston and Sequin of Bath.

Commander C. J. Boush gives notice that on or about June 15, 1908, Boston Light Vessel No. 54 will be temporarily withdrawn for repairs and the station marked by Relief Light Vessel No. 66. Relief Light Vessel No. 66 will have the same characteristic lights, fog signal and submarine signal as Light Vessel No. 54, except that the lights will be electric.

A new concrete wharf, to cost over $42,000, is to be built at Fort Williams, Portland, Me., by the Boston contracting firm of McHale & Perkins. It will be the first of the kind ever constructed in this district. Bids for the construction of the wharf were opened at the United States engineer's office at 537 Congress street, Portland, Me., May 14. There were only two bids submitted and were by Boston contractors. They were the H. I. Crandall & Son Co. of East Boston, whose bid was $47,123.30, and McHale & Perkins, of Boston, whose bid was $42,554.

The lobster smack Electric Light, owned in Boston and bound for Nova Scotia, was burned at a wharf in Vinalhaven, Me., May 19 and sank. The accident was caused by the explosion of gasoline while the engineer was filling a tank.

The Wilson liner Consuelo, which has made many voyages to Boston and New York from England, has been sold by Thomas Wilson & Sons to the Thomson line, and she will be renamed Cairnrona. She has a carrying capacity of about 14,000 tons and is capable of 14 knots. She was purchased by the Thomson line to replace the Kildona, which was lost a few months ago. The Cairnona will be placed on the St. Lawrence-London service after passenger accommodations and refrigerator space have been installed.

The Massachusetts nautical training ship Enterprise will not make her regular foreign cruise this season, but will cruise in home waters. A naval board of survey reported that at least $14,000 would be necessary to put the ship in condition for such a cruise, and as it is expected that the Enterprise will be replaced next year by a much more modern ship the expendi-

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ture of such a sum was not deemed altogether advisable.

At Lawley's ship yard in South Boston, there are at present three big gasoline cruising yachts under construction. One is a 90-footer from designs of Arthur Binney, of this city.

Sidney M. Davidson, superintending engineer for England of the Submarine Signal Co., recently joined the ranks of the benedicts.

G. H. C.

THE LOOKOUT.

The new six-masted schooner Edward J. Lawrence, the third largest wooden schooner in the world, made her first appearance at the port of Boston last week, bringing in a cargo of coal from Norfolk, Va. The Lawrence was launched from the yard of Percy & Small at Bath, Me., on April 2 for the J. S. Winslow Co. of Portland, being the fifth six-masted schooner constructed at that yard. She is 320.2 ft. in length, 50 ft. beam, and 23.9 ft. deep and of 3,350 tons gross. In her equipment is one of the largest Hyde windlass outfits, also two power boats, one 27 ft. long, fitted with a 10-horsepower engine. The equipment also includes two patent stockless anchors, each weighing about 8,700 pounds. The cost of building the vessel was nearly $200,000 and she is the third largest six-master afloat, the next being the Eleanor A. Percy, of 3,401 gross tons, and the largest, the William L. Douglass, owned by the Coastwise Transportation Co. of this city, of 3,708 tons gross, built by the Fore River Ship Building Co.

On account of the continued dullness in freight traffic, the Metropolitan line has taken off temporarily the steamer Herman Winter, and she has been hauled over to National dock, East Boston, where her sister ships, H. F. Dimock and James S. Whitney, have been tied up for several months. It is believed that the business of the line can at present be taken care of by the H. M. Whitney and the express turbiners Yale and Harvard.

Recent quotations for coal cargoes from Philadelphia to Boston averaged 55 cents per ton. A few years ago $1 was considered low.

A proposition for the Kennebec and Boston steamboats of the Eastern Steamship Co., to make Boothbay a port of call both ways this

GANLEY BROS., SAULT STE. MARIE, ONT.

Str.	D. C. Whitney	James Ganley	George Paterson

LEHIGH VALLEY TRANSP. CO., BUFFALO, N. Y.

Str.	Tuscarora	W. Williams	L. Pherson
"	Saranac	J H. McDonald	John Halldin
"	Seneca	Archie A. McMaugh	———
"	Bethlehem	E. Klock	W. C. Gilbert
"	Wilkesbarre	D. Driscoll	John Lachy
"	Mauch Chunk	C. S. Furey	H. Willson

PENNSYLVANIA-ONTARIO TRANSPORTATION CO., CLEVELAND, O.

Str.	Ashtabula	B. T. Haagenson	S. M. Sylvester

SOUTH SIDE LUMBER CO., CHICAGO, ILL.

Str.	Philetus Sawyer	J. F. Higgie	Henry Baldwin

D. SULLIVAN, MGR., CHICAGO, ILL.

Str.	John Crerar	J. B. Rinn	James Fox
"	H. G. Dalton	Harry L. Jones	John E. Skeldon
"	A. D. Davidson	B. J. Sloan	William Norcross
"	George C. Howe	George E. Talbot	William Egan
"	J. S. Keefe	Dan Barry	Charles Miller
"	John Lambert	D. T. Sullivan	John Patterson
"	A. M. Marshall	T. B. Greenway	Allan W. Scott
"	S. N. Parent	F. H. Johnson	Colin T. Kidd
"	John Sharples	T. J. Carlisle	Frank Langer
"	Robert Wallace	J. A. Connelly	W. H. Furey
"	E. J. Earling	D. C. Sullivan	Richard Piepkorn
"	B. F. Berry	Edw. Fitch	George Winters
"	W. H. Wolf (Old)	John Hutton	William J. McSweeney
"	W. E. Fitzgerald	A. C. Callam	John McCaffery
"	James S. Dunham	Frank Pratt	Ed Purvis
"	W. H. Wolf (New)	John Wanvig	John Bustead

TOLEDO BUILDERS SUPPLY CO., TOLEDO, O.

Str.	Walter D.	J. B. Warner	Henry Sullivan
"	Laura D.	C. P. Sherbno	DeWitt C. Field
"	Dussault	John Moesing	Valentine Felter

TURBINE STEAMSHIP CO., HAMILTON, ONT., CAN.

Str.	Turbinia	B. Bongard	Joseph Pringle

FRANK S. UPTON, CHARLOTTE, N. Y.

Str.	Saginaw	L. Ludington	J. A. Dillon

WALLACE & CUNNINGHAM TRANSIT CO., DEARBORN, MICH.

Str.	W. B. Morley	Arthur Sturgis	Herman Gunderson

JOHN DORRINGTON, 62 SPRUCE ST., DETROIT, MICH.

Sch.	Maria Martin	John Dorrington	

F. W. GILCHRIST, ALPENA, MICH.

Str.	Viking	John Place	———
"	S. C. Hall	Thomas Lillis	———
Bge.	Sam Flint	Alex McLean	

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"	Oscoda	Jay P. Jennings	Edward Knibbs
"	Louis Pahlow	W. J. McKay	Hiram Fuller
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"	Lizzie A. Law	John Lorenzen	
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Sch.	Corisande	D. Sutherland	
"	Cataract	W. Sutherland	

summer, after serious consideration, has been abandoned as not practical under existing conditions. The court ordered the receivers of the steamship company not to make any experiments while the matter is in the hands of the court.

A resolve appropriating $8,000 for the improvement of Rockport harbor which was introduced by Representative McIntire of Gloucester has successfully passed the Massachusetts House, and been sent to the senate.

Capt. Peterson, of the United Fruit Co.'s fleet, has gone to Belfast, Ireland, to take command of the company's new steamer Cartago which is the first of three new steamers to be fitted for service from this port.

DISTANCE OF VISIBILITY ON WATER.

The relative visible distance of an object on water is useful to the navigator in arriving at the approximate distance of a beacon light when it first comes in view above the horizon in clear weather. It also affords a ready means of estimating by eye alone the distance of an object, by referring its water line to the horizon.

As the observer's eye is naturally above the sea or lake level, the limit of view is called the visible or apparent horizon, and the angle between this and the sensible (true) horizon, is called the dip of the horizon. It means an increase in the visibility caused by the elevation of the eye above the level of the water.

The distance of the visible horizon (the apparent meeting of the sea and sky; also termed sea horizon) must depend mainly upon two things, viz., the curvature of the earth's surface, which is assumed as constant, and the height of the observer's eye, which, of course, varies according to circumstances.

Sensible Horizon.—The sensible or true, horizon is the plane on which the spectator stands produced to meet the celestial concave (the heavens). This plane extends north, south, east and west, until bounded by the sky.

Dip of the Horizon is the angle of depression of the visible sea horizon below the true horizon, arising from the elevation of the eye of the observer above the level of the lake or sea.

In the above figure A is the position of the observer, whose height above the level of the water is A B. C A Z is the vertical line of the observer, consequently a line drawn at right angles to this vertical line, from the eye of the observer (A H) will represent the true or sensible horizon. But the observer viewing the visible or sea horizon (the apparent meeting of the sky and water) looks in the direction of A T H, and T, disregarding refraction, is the most distant point of the surface visible from A. A T is tangent to the earth's surface, and shows the apparent conjunction of the water and sky due to the earth's curvature, which limits the observer's view and cuts it off at that point. Thus the real cause of this phenomenon is the curvature of the earth's surface which causes the apparent meeting line of the sea and sky to extend as we go higher up.

The Vertical Line is a straight line perpendicular to the horizon of the observer. It coincides with the direction of the

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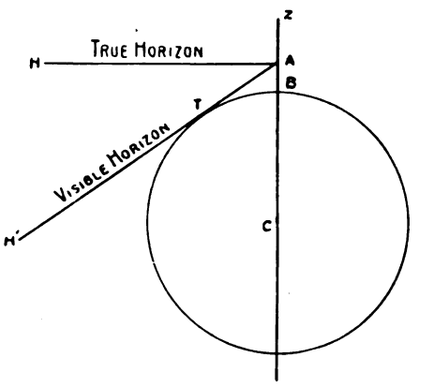
plumb line, or the simple pendulum at rest.

The *Zenith* is the point in the celestial concave which is vertically over the spectator's head. The *Nadir* is the point in the celestial concave which is vertically below the position of the spectator. The *Zenith* and *Nadir* are the poles of the horizon, that is to say, they are 90 degrees from every point of it.

If a plummet be freely suspended by a flexible line and allowed to come to a state of rest, this line is called a vertical line. That point of the heavens to which the line points, and which it would appear to reach if it should be prolonged indefinitely upwards, is the *Zenith;* while if the direction of the line be prolonged downwards through the earth it will point to that part of the celestial sphere which is termed the *Nadir.*

Owing to the existence of terrestrial refraction the most distant visible point of the earth's surface is more remote from the observer than the point T in the foregoing diagram.

The next thing to be considered is refraction. What is refraction? What causes it, and what is its effect? Refraction is a curving or bending of the rays of light caused by their entering the earth's atmosphere, which is a denser medium than the impalpable ether of the outer sky. The effect of refraction is frequently seen when an oar is thrust into the water, and looks as if it were bent. Refraction is also defined as the change in the direction of a ray of light in passing through atmospheric mediums of



ROTUNDITY OF THE EARTH AND REFRACTION OF THE ATMOSPHERE.

varying density. The effect then of refraction is to throw up the horizon and increase the observer's visibility to the apparent horizon. In the case of a heavenly body, refraction enables us to see it when it is really below the horizon. Refraction is greatest near the horizon and gradually diminishes and disappears at the zenith. Refraction is a trifle greater on land than on water.

Thus we are made acquainted with the dip of the horizon and refraction, the former of which increases the view of visibility on account of the eye being above the level of the water, and the latter in affecting the rays of light in passing from the edge of the water to the eye accounts for the horizon appearing higher than it really is, which likewise has the effect of increasing the distance of visibility; and a like source of error exists in the observed angular elevations and depressions of objects on land.

In the case of the sun at rising and setting the effect of refraction is to elevate the sun's center about 33 minutes above the horizon, that is to say, when the sun is on the horizon (its lower limb or edge kissing the water) the sun is in reality below the horizon just that much, that is, its upper limb or edge is in contact with the sea horizon. For navigational purposes the diameter of the sun equals about 33 minutes of the arc of the sky, so that when it becomes necessary to observe its bearing when on the horizon (amplitude) wait until its lower limb is about a semi-diameter above the horizon.

If the effect of refraction causes the horizon to appear higher than it really is, so much refraction cause the land and its objects to appear higher, and consequently increases their visibility.

Knowing these facts we will continue with the subject started.

It is a remarkable coincidence, and one that is not due to an arbitrary measure, nor any scale in connection with nature, but just an "accidental relation, and one that is easy to remember," says Raper, and that is, the square root of the height in feet of the observer's eye corresponds approximately to the distance (in nautical miles) of visibility. Thus, if the height of the eye is 16 ft., the distance of the visible sea horizon will be about four nautical miles; if the height of the eye is 25 ft. the distance will be about five nautical miles. However, this has no regard to refraction, which correction must be applied to make it beneficial; therefore, when some degree of accuracy is aimed at multiply the distance (the root found) by the factor 1.15, the same factor that you multiply nautical miles by to get statute miles, and this again is another coincidence, though not so remarkable. The distance thus found, bear in mind, is nautical miles just the same, and to obtain statute miles multiply again by 1.15. Thus, in the above example of five miles, $5 \times 1.15 = 5.75$ nautical miles, and $5.75 \times 1.15 = 6.60$ statute miles. Just compare this with the following table, in which the distance corresponds to a height of 25 ft.; pretty close, isn't it? This is knowledge well worth knowing, for a table containing this information is not always at hand; and, too, its solution is easily arrived at.

The officer on watch could employ this to advantage every hour of the day and night, when in sight of land, and the weather clear.

If an observer, whose eye is elevated say 20 ft. above lake level, is passing a small island, rock, ship, or other object, whose water line appears one unbroken continuation of the visible horizon, he knows that his distance from it is rather more than five miles. If the water line of the object appears nearer to him than the horizon, he knows that the distance must be less than five miles; and, if the water line is invisible, and consequently beyond the horizon, he knows that it must be greater than five miles. Indeed, by ascending or descending till the water line of the object comes on a new horizon, corresponding to the altered level, it is possible to make a very fair shot at the distance.

Similarly, in clear weather, when a beacon light shows itself above the horizon, the approximate distance from it may be found as follows: Take the square root of the elevation of the observer's eye, and the square root of the elevation of the light, both in feet. Add them together, and multiply by 1.15 to allow for refraction, and to obtain statute miles multiply this product by 1.15. Let the eye, for example, be 16 ft., and the light (Twin River Pt.) 110 ft. above the lake level. The square root of 16 is 4, which, added to 10.5, the square root of 110, gives 14.5 knots, and this multiplied by 1.15 gives 16.675 knots (refraction allowed) and this multiplied by 1.15 gives 19.1 statute miles. Work this same example according to data obtained in the table of distances following, and they will be found to be practically the same.

The accompanying table will explain itself. The distance in each case has been corrected for refraction, and is in statute miles. It is an easy reference, and on this account is probably preferable to cudgelling one's brains over the extraction of square roots. Nevertheless, the square root method can be used to advantage in more ways than one.

Table of maximum distance at which an object on water is visible according to its elevation and that of the observer, the weather being clear and the refraction normal:

The distances of visibility given in the table are those from which an object may be seen by an observer whose eye is at the lake level; in practice, therefore, it is necessary to add to these a distance of visibility corresponding to the height of the observer's eye above lake level.

Example.—Two River Point light seen just at the horizon, what, under ordinary conditions of the atmosphere, is its distance from the observer?

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	Statute miles.
Height (according to List of Lights and Fog Signals), 110 feet, distance visible (according to table).....	13.88
Add distance corresponding to height of observer's eye above lake level, 15 feet ..... =	5.12
Distance of light.....	19.00

Distances corresponding to heights not included in the above table may be found by the formula D = ½ √7 H, in which H equals the elevation, or height in feet, of the object above lake level, and D equals the corresponding distance of visibility, which in simple arithmetic means that H (the height in feet) is multiplied by 7 and half the square root of the product equals D, the distance of visibility in statute miles; thus the height of 25 ft. multiplied by 7 equals 175, the square root of which is 13.2, one-half of which is 6.6 (see distance in table corresponding to 25 ft.). This formula is based on the mean curvature of the earth and is corrected for ordinary atmospheric refraction. Here is another formula: D = 1.317 √× in feet, in which D is the distance in statute miles, × the height of the eye or the object in feet, thus the square root of 25 is 5 × 1.317 = 6.58 (practically the same thing as above).

FOR FINDING THE DISTANCE OF TERRESTRIAL OBJECTS AT SEA, IN STATUTE MILES.

Height in feet	Distance, Mil. Dec.	Height in feet	Distance, Mil. Dec.	Height in feet	Distance, Mil. Dec.	Height in feet	Distance, Mil. Dec.	Height in feet	Distance, Mil. Dec.	Height in feet	Distance, Mil. Dec.	Height in feet	Distance, Mil. Dec.	Height in feet	Distance, Mil. Dec.
1	1.32	26	6.75	55	9.81	210	19.17	460	28.37	920	40.13	3,100	73.7		
2	1.87	27	6.87	60	10.25	220	19.62	470	28.68	940	40.56	3,200	74.8		
3	2.29	28	7.00	65	10.67	230	20.06	480	28.98	960	40.99	3,300	76.0		
4	2.65	29	7.12	70	11.07	240	20.50	490	29.29	980	41.42	3,400	77.1		
5	2.96	30	7.25	75	11.46	250	20.92	500	29.58	1,000	41.80	3,500	78.3		
6	3.24	31	7.37	80	11.83	260	21.33	520	30.17	1,100	43.90	3,600	79.4		
7	3.50	32	7.48	85	12.20	270	21.74	540	30.74	1,200	45.80	3,700	80.5		
8	3.74	33	7.60	90	12.55	280	22.14	560	31.31	1,300	47.70	3,800	81.6		
9	3.97	34	7.71	95	12.89	290	22.53	580	31.86	1,400	49.50	3,000	82.6		
10	4.18	35	7.83	100	13.23	300	22.91	600	32.41	1,500	51.20	4,000	83.7		
11	4.39	36	7.94	105	13.56	310	23.29	620	32.94	1,600	52.90	4,100	84.7		
12	4.58	37	8.05	110	13.88	320	23.67	640	33.47	1,700	54.50	4,200	85.7		
13	4.77	38	8.16	115	14.19	330	24.03	660	33.99	1,800	56.10	4,300	86.8		
14	4.95	39	8.26	120	14.49	340	24.39	680	34.50	1,900	57.70	4,400	87.8		
15	5.12	40	8.37	125	14.79	350	24.75	700	35.00	2,000	59.20	4,500	88.7		
16	5.29	41	8.47	130	15.08	360	25.10	720	35.50	2,100	60.60	4,600	89.7		
17	5.45	42	8.57	135	15.37	370	25.45	740	35.99	2,200	62.10	4,700	90.7		
18	5.61	43	8.68	140	15.65	380	25.79	760	36.47	2,300	63.40	4,800	91.7		
19	5.77	44	8.78	145	15.93	390	26.13	780	36.95	2,400	64.80	4,900	92.6		
20	5.92	45	8.87	150	16.20	400	26.46	800	37.42	2,500	66.10	5,000	93.5		
21	6.06	46	8.97	160	16.73	410	26.79	820	37.88	2,600	67.50	1 mile	96.1		
22	6.21	47	9.07	170	17.25	420	27.11	840	38.34	2,700	68.70				
23	6.34	48	9.17	180	17.75	430	27.43	860	38.80	2,800	70.00				
24	6.48	49	9.26	190	18.24	440	27.75	880	39.25	2,900	71.20				
25	6.61	50	9.35	200	18.71	450	28.06	900	39.69	3,000	72.50				

The distance of visibility of a light may be greatly augmented by abnormal refraction, which usually increases with the height of the barometer and a falling temperature.

It must be understood that the foregoing table refers to only such lights (first and second order) as have sufficient power to be seen at distances corresponding to their elevation. It is necessary to discriminate between the luminous range and the geographical range; the one depends upon the power of the light, and the other upon its elevation. For example, the light on Grand island, Lake Superior, has an elevation of 205 ft. above the lake level, which to an observer whose eye is elevated 15 ft., should give it a range of 24 miles, but it cannot be seen, under ordinary conditions, more than 18 miles. It is a fourth order light. The lighthouse board gives it a visibility of 19¼ miles, this being its luminous range instead of geographical, which accounts for the difference in visibility as found by the tables and that given in the lighthouse book. Rock Island light, Lake Michigan, is another example; its luminous range is given at 19¼ miles, but it is such a poor affair that 15 miles would be more applicable.

The horizontal angle (bearing) between the ship's course and a beacon light when it first pops into view above the horizon, can be used to determine the approximate distance the ship is from it, and by its bearing the ship's position can be fixed on the chart. Thus, the height of your eye (on the bridge) is 25 ft. above the lake; Grosse Point light is just coming into view, how far are you from it? From the table:

	Statute miles.
Thirty-five feet elevation, distance of horizon	7.83
One hundred and twenty feet elevation, distance of horizon.....	14.49
	22.32

Thus, the distance is 22.3 miles, and at the first view of the light its bearing by standard compass was carefully observed and marked down. The corrected bearing (allowance for deviation and variation, if any, to convert the compass bearing to the true bearing) and the above distance being laid off on the chart, of course, will fix the vessel's position at the time recorded.

This example may be put in another way:

The officer of the watch having, in the intervals of looking out ahead, kept his eye on this light, which he has on his quarter, say, notices at last it is about to dip below the horizon, and wishing like a sensible man, to verify his vessel's position, seeing that fog or thick weather may come on at any time, he carefully observes and marks down its bearing by standard compass. At the moment of disappearance he notes the time by watch, or wheel-house clock, and has the log read. He knows his height and the height of the light observed and from the table ascertains its range of visibility, and with the corrected bearing locates the position of the vessel on the chart.

To check light ranges by the table is always advisable inasmuch as some books give this item very incorrectly; and, in any case, it is manifest, from what has been said, that the range must depend upon the varying height of the observer's eye—whether he be on the lofty bridge of a large steamer, or on the bridge of a small vessel, and, too, whether your boat be flying light or be loaded.

In the government light list the range is calculated for a height of eye of 15 ft. In the column "Distance visible, in statute miles," will be found the distances which the lights can be seen under ordinary conditions of the atmosphere. These distances are at times greatly increased by augmented atmospheric refraction, especially on Lake Superior.

In the majority of cases the distances given are geographical ranges, computed from the table and formula given. In the cases in which the distances given are smaller than would be found by computation, luminous ranges have been substituted for geographical ranges, because the lights (principally the lower orders of fixed red lights) are not of sufficient power to be seen, under ordinary atmospheric conditions, to the limit of their geographical range.

WITH RESPECT TO LIGHTS.

The intrinsic power of a light should always be considered when expecting to make it in thick weather. A weak light is easily obscured by haze, and no dependence can be placed on its being seen.

Colored lights are also inferior in power to bright or white lights, and are more quickly lost under unfavorable circumstances.

CUTS OR SECTORS.

In some conditions of the atmosphere white lights may have a reddish hue. The mariner should not trust solely to color where there are sectors, but verify the position by taking a bearing of the light. On either side of the line of demarcation, between white and red, and

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also between white and green, there is always a small arc of uncertain color.

When looking out for a light at night, the fact is sometimes forgotten that from aloft the range of vision is much increased. By noting a star immediately over the light, a very correct bearing may be obtained from the standard compass before the light becomes visible to those on deck.

The range of Twin River Pt. light at an elevation of the eye at 15 ft. is given at 19 miles, but this light has been observed six miles from the Sturgeon Bay canal. The observer's eye in this case was about 25 ft. above the lake. This would give it a range of 20.5 miles, but in the case just stated its range was about 34 miles. There is a vast difference between 20.5 and 34 miles, and in many cases a departure, based upon such incorrect data, would lead to grief. Take the Sturgeon Bay Canal light, which has a range of 18½ miles, has been seen in a run of 30 minutes (about five miles) out of Frankfort; that is, steering for the canal from Frankfort this light has been picked up five miles outside of Frankfort on the canal course. The distance from Frankfort to the canal is 53 miles, thus the light was seen 48 miles, or it appeared to be seen at that distance. Of course, in both cases abnormal refraction has temporarily lifted these lights above the horizon, and made them visible at a point, where, under ordinary conditions, such a thing would be impossible. The reverse of this phenomenon occasionally happens. In the case of the canal light the red flash could not be seen for a long time after the white flash was first seen. The atmosphere at the time was cold and clear, and one could almost see the refraction in the air. The stars shone with marked brilliancy, especially near the horizon, where, of course, the refraction was greatest. There are many cases where lights have been seen beyond the range of visibility, and the range held for a certain time, and then lost for a long time, notwithstanding that the vessel was approaching the light all the time. This is due to some atmospheric change, which caused it to vanish. There are times when a vessel steadily approaching a light will not be able to see it until inside the ordinary range of visibility, and this will happen in clear weather, which all goes to show the effects and freaks of refraction.

Mariners in mid-lake have seen the lights of Big Point Sable, Twin River Pt. and the Sturgeon Bay canal all at the same time. They were in about the center of the group, a radius of 32 miles, which, in this case, was the range of each. The ordinary range of these lights is about 19 miles.

The sand bluff (the third in height) about three miles north of Arcadia, east shore of Lake Michigan, is elevated 400 ft. above the lake. If from the height of your eye in standing on the bridge, it was 20 ft. to the water, and in crossing the lake under ordinary conditions, at what distance should you see the top of this bluff above the horizon? Answer, 32 1/3 miles.

The two bluffs between this one and Arcadia are, the one 180 ft., the other 60 ft. The bluff about 2½ miles south of Frankfort has an elevation of 300 ft., and the one at South Frankfort is 265 ft., the one back of Frankfort, on the north side, 120 ft., and the one just north of Frankfort pierhead is 323 ft. above the lake. Work each one of these out and see what their ranges are. When the tops of these bluffs are picked up in mid-lake they resemble small islands.

Here's another wrinkle worth knowing: Having ascertained by the range tables the distance that you are from a light when it first comes in view, take its bearing and see what the angle is between it and the course you are steering; and to determine the approximate distance at which the latter will be passed abeam, provided always that the same course be steered and made good, proceed as follows: Seek in the tables of hypotenuse, perpendicular, and base, with the angle between the course and light and with the distance in the hypotenuse column opposite it, in the base column will be found the passing distance required; and that shown against it in the perpendicular column will be the distance that the vessel will have to run in order to get the light abeam.

Example.—You are steering S by E by compass, and at the first appearance of Grosse Point light, its bearing is taken as S ½ W, and its range calculated at 19 miles. Seek in the table for angle of 1½ points (which is the difference between course and bearing) and with 19 in the hypotenuse column opposite it in the base column will be found 5.5 miles, the distance that she will be from the light when she has it on her beam; and in the perpendicular column will be found 18.2, the number of miles that the vessel is required to steam in order to bring the light abeam.

Remember what has been said about this method, and the check to be used, as it only gives approximate results. Bear in mind that current, leeway, or bad steering, is apt to have a finger in the pie.

In the case of the ship knowing her actual distance from a light or other object (found by cross bearings, or otherwise) then the above method cannot be beaten for quick and accurate work; for all that is required is to know the distance and angle, and the remainder of the data necessary for its solution you get out of the tables. If the distance as found from the tables is going to carry the vessel in or out more than is desired, the course can be altered accordingly, and likewise, the correct amount of change can be got from these same tables. For example: Supposing that you were 13 miles from a light and its bearing was two points from the course. In table under angle of two points and distance 13 in hypotenuse column gives against it in base column five, the number of miles that the vessel will be off when abreast of the light; but supposing that you desired to be only three miles off when abreast, how much have you got to haul her in? Even this information can be found from these tables: Seek in the tables and find the angle where 13 in the hypotenuse column agrees with two (5 — 3 = 2) in the base column, and this will be the required amount to haul her in. In the above case it will be found under angle ¾ point. Pretty handy, isn't it?

QUESTIONS FOR WHEELSMEN AND WATCHMEN.

489. It takes you 3 hours 45 minutes to run from Cleveland to SE shoal, 42¾ miles, how fast are you running per hour?

490. Your boat makes 10¼ miles per hour, how long will it take her to cover the above distance?

491. How many marks between 6 fathoms and 16 fathoms on the lead line?

492. How many marks on the lead line between 18 and 20 fathoms?

493. What point on the compass is N 270 degrees E?

494. How many degrees is NW to the right of north?

495. You have a variation of 42 minutes, how much would you allow in points on the compass?

496. Supposing the variation were 43 minutes, how much would you allow?

497. Is 2 degrees 7 minutes nearer to ⅛-pt. or ¼-pt.?

498. What point on the compass is 225 degrees to the right of N?

469. How many degrees in ⅞-pt.?

ANSWERS TO QUESTIONS FOR WHEELSMEN AND WATCHMEN.

478. 2.5125 hours.

479. 3.3 miles.

480. 5.5 minutes to make a mile, and is running 10.9 miles an hour.

481. 7½ minutes.

482. 12.69 hours, or 12 hours 62 minutes, nearly.

483. SW ⅛ W.

484. W ½ S 85½ miles.

485. 10.17 miles.

486. ENE.

487. West.

488. W by N.

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REAR ADMIRAL EVANS ON THE NAVY.

Rear Admiral Robley D. Evans recently gave a reporter of the *New York Times* an interview, of which the following are essential features:

"What, in your opinion," I asked, "is the most vital question affecting the navy today?"

"The shortage of officers and men, particularly officers. We have not a battleship in commission today with a sufficient number of officers properly to look out for her battery. Those we have are excellent, but they are so overworked that they are giving way under the strain. Men can be trained for duties on ship board, as has just been shown in the cruise of the Atlantic fleet to the Pacific. But it is not so with officers. In case of a sudden outbreak of hostilities we would find ourselves seriously handicapped from this cause."

Lieut. Frank T. Evans, now attached to the battleship Louisiana, and who is to rejoin his vessel within a few days, having been given leave to accompany his father home, added a word of testimony. "A battleship like the Louisiana," he said, "should have at least 25 commissioned officers to handle her battery. Now, what have we? On the Louisiana and her class we have an average of two lieutenants and say, about four or five ensigns on each ship. It is the same with all the rest. The condition speaks for itself."

The admiral was then asked what was the chief lesson to be drawn from the cruise of the battleship fleet to the east.

"There are two," he replied. "First, the absolute necessity for two fleets, one on the Atlantic and one on the Pacific. The cruise of the Atlantic fleet was made in practically as short time as a fleet could be sent in time of war. From the time we left Fort Monroe the whole Pacific coast could have been raided and the enemy gone about his business before our fleet arrived. That was the first lesson. The second lesson is that we took the fleet to sea with one-third of the men untrained and arrived at Magdalena Bay, or the Pacific entrance to the Straits of Magellan, absolutely in condition to go into an engagement. The fact that men could be so trained at sea is one of the most important lessons of the cruise. The cruise has shown that it is not necessary to spend a long time in port to train men to shoot."

"What efficiency, if any, was gained by the officers of the cruise?"

"I think there was an enormous increase in the efficiency, due to the fact of sea training. I mean by that the necessity of training the men at sea, and that necessitated the acquirement of great knowledge on the part of the officers, because the majority of them had never before undertaken such sea training.

"I might also add that it has served to make the service more popular and better known around the country than it ever was before. The work of the newspaper men who were permitted by the president to go with this cruise has done more than all other things put together to make the navy popular among the people. The writing done by these gentlemen has been admirable, and has gone into every part of the country, among all classes of the people."

"What should be our future naval strength and how distributed?"

"Forty-eight battleships, with the necessary cruisers, torpedo boats, submarines, and auxiliaries. They should be distributed, 24 on the Pacific and 24 on the Atlantic; 16 in commission on the Pacific and 8 in reserve; 16 in commission on the Atlantic, and 8 in reserve."

"Would the possession of a big navy be likely to involve us in turmoil with other nations?"

"I think," said the admiral, "that it would have exactly the opposite effect; it would keep us out of trouble with other nations. I do not think there is anything that is so sure a guarantee of peace as a powerful navy, a navy so powerful that other nations would be afraid to attack it."

"Then you regard a big navy as an insurance against war?"

"Absolutely, and the only insurance against war."

"From your standpoint, then, those ministers who recently petitioned congress to reduce the navy were not well advised?"

"From their standpoint they may have been well advised, yes; but their standpoint is very different from mine."

The interviewer asked the admiral his idea of what an action between modern armor-clads would mean.

"It would mean," he said, "a sea covered with floating wrecks the first half hour of the battle. I think the first 10 minutes will determine the result. The fleet that first gets the range of the enemy and is best handled after the range is obtained will undoubtedly do such damage in the first 10 minutes as to practically disable the opposing fleet. Considering the rapidity and accuracy of fire of modern high power guns, it seems impossible that any ship can stand the battering effect of such a fire when properly concentrated for a longer period than, say, 10 minutes."

"What type of battleship do you consider is the most efficient?"

"One-battery battleships of about 25,000 tons. When I say one-battery ships I mean 12-inch or heavier guns for the main battery and for torpedo defense 6-inch guns. I do not regard high speed as of vital importance. I think the effect of speed above 18 knots is much overestimated."

In this estimate of the value of speed the admiral takes issue with many authorities on the subject. With so many asserting that high speed is essential to success in war, the admiral's low estimate of its value will appear almost iconoclastic. It was only recently that Capt. Bradley A. Fiske, one of our most distinguished officers, made a forceful argument for high speed. In the naval institute he said that "it seems as if a fleet which could go two knots per hour faster than an enemy's fleet would—after meeting on the open sea—be able to abstain from battle until the weather conditions enabled it to take position that would enable it to make more than twice as many hits per gun per minute as the enemy. * * * It might be possible for the faster fleet to abstain from fighting until the slower fleet's coal had been consumed; of what use would the superior gun power of the slower fleet be then? If the opposing admiral happened to be of an unamiable disposition he might then simply steam away, taking all of the colliers and supply ships, and leave the other fleet immobile on the ocean, admiring its powerful guns."

Having given his opinion of the battleship, the admiral was asked for his estimate of the value of the armored cruiser.

"If properly constructed and kept as an armored cruiser," he replied, "I think the value of that class of vessels is very great, for the purpose of locating an enemy and notifying the commander in chief of his whereabouts; but recent efforts to amalgamate the cruiser and the battleship have had the effect of making an inefficient cruiser and a poorly armored battleship. The two were types to be kept absolutely distinct—one for fighting and the other for scout work."

"What part do you think dirigibles will play in the next war?"

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"About the same part that submarines have played in the past. Dirigibles may be used to frighten and make nervous timid men, as submarines have been used in the past. But their actual value is very questionable. Wireless, however, will be of extreme value."

Of the enlisted men of the navy the admiral spoke with much enthusiasm and accorded great praise to the bluejackets of the service. These are very young and the majority of them were recruited from the districts of the Middle West. Asked if these inland-born youths showed the same adaptability for the service as those reared on the seaboard, the admiral said that, considering present conditions, he thought they showed fully as much. "By present conditions," he added, "I mean the mechanical seamanship that is required nowadays, as distinguished from the marlinspike seamanship of former days."

The destructive effect of modern shell fire is tremendous and terrific. A foreign naval attache, struck with the youth of our bluejackets, had wondered whether these could stand the shock of battle as well as men of maturer years. The admiral was asked for his opinion.

"I think they could stand it better," he said. "They have fewer responsibilities in life than the older men, and less to think about. Yes, I believe they could stand it better than older men."

"Several amusement resorts have recently denied admission to enlisted men who have appeared in uniform—"

"If I had my way with such people," the admiral interrupted, "I would put them in the penitentiary, where they could not do any further harm."

It is the announced intention of the navy department to bring the big fleet home by way of the Suez Canal, calling en route at Hawaii, the Philippines, Japan, China, and Australia. It is upon Rear Admiral C. S. Sperry that has devolved the duty of leading it on this extended tour. Such a fleet sent to sea by any other nation would be commanded by an admiral its second squadron by a vice admiral, and its divisions by rear admirals. The rank of admiral was bestowed upon Dewey, but in our service there is no officer on the active list above the rank of rear admiral, all efforts to revive the rank of vice admiral having failed.

The fleet is to show the flag in numerous foreign ports, and it is more than likely that the rear admiral commanding it will frequently find himself junior to officers commanding very inferior forces. Thus much of the prestige of this showing the flag around the world tour must inevitably be lost.

"We should have an officer of the rank of admiral in command of that fleet," Rear Admiral Evans said. "At the very least there should be a vice admiral. All other considerations aside, there are military reasons why this should be so. You would not put a regiment in the command of a major, yet, in a relative way, that is exactly what has been done with this fleet. There is another strong reason in the fact that in joint operations, no matter how strong your own force may be, unless the officer commanding it is of high rank, he will be likely to find himself junior to some foreign officer.

"Without any reference to the dignity of the country, it is anything but pleasant for the flag officers representing the nation to walk out to dinner, or to other social functions, behind representatives of all other nations."

Admiral Evans was asked what, in his opinion, would be the probable effect of the visit of the fleet to these far-off eastern ports.

"It will tend," he said, "to cement the friendship already existing between the United States and the various countries which this fleet will visit. I think the effect will be further accentuated in the far east by the cordiality of the reception in Australia, that the interest excited in Australia, and her evident intention of having a hand in the control of the Pacific trade, will be very marked."

BOWLES ON OCEAN MAIL BILL.

Francis T. Bowles, president of the Fore River Ship Building Co., who resigned the office of chief constructor of the navy to enter business life, in a talk May 17, declared that the mail subsidy amendment to the postoffice appropriation bill was in danger of failing to become a law on account of "the irresolution and incapacity" of a few Republican congressmen. Rear Admiral Bowles had the following to say:

"I am surprised and indignant at the apparent irresolution of the house Republicans when the opportunity is within their grasp to pass the ocean mail bill. More favorable conditions have never presented themselves to enable the Republican party to take an important step toward the development of the American merchant marine and give some meaning to party promise and some attention to the recommendations of the president, the carefully studied opinion of Mr. Root, to a policy advocated by Mr. Taft, to the specific request of the postmaster-general, and to reiterated demand for this bill of the National Association of Manufacturers, the boards of trade of Cleveland, St. Louis and Indianapolis and the chamber of commerce of New York. The situation is remarkable in the fact that there is no criticism of the details of the bill nor the manner of its advocacy.

"Early in April the acting Republican whip of the house, Mr. Burke, of Pennsylvania, made a canvass which showed a safe majority for the bill. Last month on a test vote the senate stood 46 to 12 in favor of the bill. The last year's discussion of the subsidy measures, the voyage of the battle fleet, with its dependence on foreign auxiliaries, I believe, have had a profound effect on public opinion, and I am confident that a large majority of congress, regardless of party, favor the passage of the ocean mail bill.

"If it fails of enactment it will be due to the timidity, the irresolution and incapacity of a few Republicans who will thereby thwart the will of the people and stultify the party promises. The manufacturers of Indianapolis, Milwaukee, Chicago and Cleveland have collectively and individually and by delegation asked specifically for the passage of this bill now.

"My experiences in the navy and in commercial ship building have convinced me, after careful study, that the maintenance of our flag on the ocean, so necessary to our developing export trade and essential to the military value of the navy and the army, can only be secured by such legislation, now too long deferred."

LACKAWANNA STEEL CO. GETS CONTRACT.

The Lackawanna Steel Co. has secured the contract to furnish 7,000 tons of sheet steel for the government ship lock in the Black Rock ship canal. The Lackawanna Co. secured the contract in the series of competitive tests in which all the big steel-making companies participated, including the Steel Corporation.

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STATUE DEDICATED TO M. A. HANNA

A magnificent bronze statue of Marcus A. Hanna was unveiled in University circle, Cleveland, Saturday afternoon, May 23. Samuel Mather, chairman of the executive committee of the voluntary organization of subscribers, called the gathering to order. Eulogies were spoken by Secretary of War Taft, John W. Griggs, former attorney general of the United States, who was the formal orator of the day, and Warren S. Stone, grand chief of the Brotherhood of Locomotive Engineers. In the absence of Vice President Fairbanks, former Governor Myron T. Herrick acted as chairman of the day, and read a letter of regret from the vice president. Monsignor Houck pronounced the invocation. The flags were released from about the statue by Mrs. Ruth Hanna McCormick and Mrs. Mabel Hanna Parsons, daughters of the late senator.

STATUE TO M. A. HANNA AT CLEVELAND, UNVEILED MAY 23.

The monument is a splendid work in bronze, the last to be modeled by Augustus St. Gaudens before he died. With one or two exceptions, the fund of $65,000 was subscribed by Cleveland people or persons who had formerly made Cleveland their home. The bronze figure, in characteristic sitting posture, is 8 feet high, and the pedestal is 6 feet square and 8 feet high. Upon the pedestal is borne this inscription:

> TO MARCUS ALONZO HANNA
> this monument is erected by friends and fellow citizens commemorating his efforts for peace between capital and labor, his useful citizenship and distinguished public service.

In the course of his address John W. Griggs said:

It is not remarkable that Senator Hanna should have achieved conspicuous success as a captain of industry; what is remarkable and without a parallel is the fact that after spending all the years of his life down to the age of 59 in business pursuits without any conspicuous participation in political affairs he moved at one step to the very front of the political organization to which he belonged and became without dissent or contradiction its leader.

Secretary Taft in his tribute to the senator said:

I feel that it is presumptuous of me to add anything to these ceremonies. I cannot let slip, however, this opportunity to express my deep reverence for his memory and his many favors to me.

It has fallen to my lot to take some part in the building of the Panama canal. To Senator Hanna the United States is greatly indebted for the part he took in deciding where the canal was to go. It would have been a grave mistake had the other route been chosen.

IMPORTANT MARINE DECISION.

An important marine decision has been rendered in the Oregon district court in the suit of the Portland Flouring Mills Co. against the Portland & Asiatic Steamship Co. The ruling is that where a portion of the cargo of a stranded vessel was salved by strangers, under direction, however, of an agent of the insurer which had written a valued policy on the cargo, and with the consent of the agent of the vessel owners, while the master stood by and gave advice, but exercised no control, the operation was equivalent to an abandonment to the insurer as effecting a surrender of the vessel's lien for freight which could not thereafter be resumed as to the salved cargo or its proceeds.

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ATLANTIC COAST GOSSIP.

Office of the MARINE REVIEW,
Room 1005, No. 90 West St.,
New York City.

The dense fog banks which blanketed New York harbor and the adjoining seaboard during the early part of the week were the cause of several disasters among seagoing and harbor craft. The Clyde line steamer Seminole went aground on the sands off Point Pleasant, near Long Branch, N. J., on Monday, while bound to New York from San Domingo and West Indian ports, two wrecking tugs standing by shortly after the grounding to assist in refloating her. The steamer Thomas S. Brennan, of the department of charities, while returning to the city from Staten Island, with a party of about 150 guests of the launching of the department's new boat, the Lowell, was run into by the Trinidad Trading Co.'s steamer Maraval on Monday evening. The Brennan was cut open from her superstructure to within two or three feet of the water line. The Maraval also suffered some slight damage.

Several trans-Atlantic liners were late in docking, due, principally, to being held up by the fog outside the Hook.

No less than three new ocean records were made by the Cunard liner Lusitania on her last west-bound passage: The records for average speed, longest day's run, and the shortest time over the long course from Daunt's Rock to the Sandy Hook lightship. The passage was made in 4 days, 20 hrs. and 22 min.; the record day's run was 632 knots, and an average speed of 24.83 knots was maintained throughout the passage. Her days' runs for the voyage were: From Daunt's Rock to noon Monday, 622 knots; Monday to Tuesday, 625; Tuesday to Wednesday, 632; Wednesday to Thursday, 628, and to Sandy Hook, 363 knots. On the day of her record run she averaged 25.42 knots.

The captain and crew of the steamer George Weems, of the Baltimore and Carolina Steamship Co., which was burned last Wednesday off Frying Pan Shoals, arrived at Baltimore on Saturday aboard the Merchants & Miners line steamer Chatham. The George Weems left Charleston Tuesday previous to her burning, the fire, when discovered, having gained great headway.

The omnibus bill amending the navigation laws was, under suspension of the rules, passed by the house on Monday. The bill, among other features, provides for additional lights and flags to prevent collisions, requires scows in New York harbor to be equipped with life lines, anchors and life preservers; and grants to local inspectors authority to regulate the length of tows of sea-going barges.

The department of charities boat Lowell was launched on Monday from the yards of the F. A. Verdon Co., Staten Island, about 1,000 persons witnessing the event. The Lowell is especially arranged for carrying the sick, and will make daily trips between the different boroughs transporting patients. She is 130 ft. in length, 30 ft. beam, and 10 ft. draught. Her contract speed is 12 knots, and cost, $75,000.

Through colliding with a schooner off Bridgeport the John H. Starin had most of her starboard side forward of the paddle box torn away last Friday. The Starin was groping her way out of New Haven harbor in a dense fog, and crashed full into the schooner Calvin P. Harris, which was riding at anchor. The bows of the schooner, a three-masted vessel of about 500 tons, were stove in. The Starin's passengers were returned to New Haven on the steamer Sea King and proceeded to New York by rail.

According to Consul D. R. Birch the inauguration recently of a freight and passenger steamship service between Italy and Philadelphia brings the latter city in direct touch with Genoa and Naples for the first time in the history of Italian-American commerce. Three sister ships will be put into service by the new company, which up till now has confined its business to the trade between Italy and South American ports, the vessels to be of 8,500 tons and an average speed of from 14 to 15 knots.

Mooring posts of cast steel instead of iron will be part of the equipment of the new Chelsea piers, on the North river, this change resulting from the breaking away of the Mauretania from her moorings during a high wind some time ago. The new posts will be of the type now in use on the North German Lloyd piers at Hoboken, being about 4 ft. in height and having two prongs.

The steamer H. M. Whitney, of the Metropolitan line, stranded in a fog on the north edge of Flood Rock, in Hell Gate, while en route to Boston on Saturday night.

Several thousand spectators lined the Battery sea wall and the roofs of the surrounding buildings last week, when the fleet of fireboats of the New York fire department was reviewed by Mayor McClellan. The boats, nine in number, maneuvered in the harbor off the Battery, for the first time in fleet formation. The two new boats, the Duane and Willard, attracted considerable attention, being equipped with fire towers and about 6 ft. longer than the New Yorker. During the exhibition of water throwing some ultra-enthusiastic photographers, much to the delight of the more fortunate spectators, managed to get in the line of fire.

A cow which ran amuck in the Lackawanna railroad terminal in Hoboken on Monday afternoon caused no little consternation on its entry into the waiting room. In the excitement two men fell off the ferry slip. They were rescued.

The department of docks and ferries, Philadelphia, has granted permission to John Hagan & Co. to erect a new pier on the Delaware river at Comly and Homestead streets.

The receipts of the French line for the year 1907, according to the reports of the stockholders' meeting held at Paris, are given as $15,000,000, expenses $12,500,000 leaving a surplus of $2,500,000. A dividend of 8 per cent on the capital stock was declared, which compares with a 6 per cent disbursement out of the 1906 earnings.

Passenger rates have been advanced on all the water routes between New York and Boston for the summer season, the rates being much the same as prevailed last summer.

The managers and employes of the Hamburg-American line, on Monday, tendered their congratulations to Christian Diehl, the New York cashier of the line, on the 50th anniversary of his service of the company. Mr. Diehl entered the service of the Hamburg-American Line's agents as an office boy on May 17, 1858.

In an opinion by Justice White, the supreme court of the United States, on Monday, decided the case of George Deslions and others vs. La Compagnie Generale Trans-Atlantique, which involved many complicated points, including a construction of the French law. The company owned the steamship La Bourgoyne, which was sunk off Sable island in 1893 in collision with the British steamer Cromartyshire.

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DREDGING APPOMATTOX RIVER.

Bids received and opened at Norfolk, Va., May 15, by Major Kuhn, for dredging Appomatox river, Va.:

Name and address of bidder—	Total price bid.
Miner Engineering Co., Washington, D. C.	$37,000.00
Maryland Dredging & Contracting Co., Baltimore, Md.	33,000.00
W. H. French & L. M. Lewis, Norfolk, Va.	35,250.00
Coastwise Dredging Co., Norfolk, Va.	40,000.00
P. Sanford Ross, Inc., Jersey City, N. J.	41,480.00
Atlantic Dredging Co., Philadelphia, Pa.	30,500.00

DAM NO. 18, OHIO RIVER.

Abstract of proposals for furnishing American Portland cement at Dam No. 18, Ohio River, received in response to advertisement dated March 2, 1908, and opened at Wheeling, W. Va., March 31, 1908, by Capt. F. C. Boggs, Corps of Engineers, U. S. A.

Name and address of bidder—	Portland Cement 6,000 barrels in sacks. Rate.	Amount.	Portland Cement 500 barrels in wood. Rate.	Amount.	Total.	Allowance for sacks.	Brand.	Weight, Lbs.
J. E. Wright Co., Wheeling, W. Va.	$1.57	$9,420	$1.57	$785.00	$10,205 60	7½c	Giant	380
	1.50	9,000	1.50	750.00	9,750.00	7½c	Alma	380
Ironton Portland Cement Co., Ironton, O.	1.42	8,520	1.52	760.00	9,280.00	7½c	Lime-stone	380
D. J. Kennedy Co., Pittsburg, Pa.	1.57	9.420	1.59	795.00	10,215.00	7½c	Bath	380
Cumberland Hyd. Cement & Mfg. Co., Cumberland, Md.	1.61	9,660	1.64	820.00	10,480.00	7½c	Dragon	375
Lehigh Portland Cement Co., Allentown, Pa.	1.62	9,720	1.64	820.00	10,540.00	7½c	Lehigh	Sacks: 380 Wood: 400
Alpha Portland Cement Co., Pittsburg, Pa.	1.57	9,420	1.59	795.00	10,215.00	7½c	Alpha	Sacks: 380 Wood: 400
Atlas Portland Cement Co., New York, N. Y.	1.568	9,408	1.59	795.00	10,203.00	7½c	Atlas	Sacks: 380 Wood: 400
Alsens Am. P. Cement Works, New York, N. Y.	1.615	9,690	1.615	807.50	10,497.50	7½c*	Alsen	Sacks: 380 Wood: 400
Miller & Coulson, Pittsburg, Pa.	1.62	9,720	1.57	785.00	10,505.00	7½c†	Penn-Allen	380

*At works. †Freight prepaid.

DAM NO. 11, OHIO RIVER.

Abstract of proposals for constructing 700 ft. of navigation pass for Dam No. 11, Ohio river, received in response to advertisement dated March 9, 1908, and opened at Wheeling, W. Va., April 7, 1908, by Capt. F. W. Altstaetter, Corps of Engineers, U. S. A.

Article.	Designation.	Quantity.	1. The T. A. Gillespie Company, Pittsburg, Pa. Rate.	Amount.	2. The Dravo Constructing Company, Pittsburg, Pa. Rate.	Amount.
Excavation	Cu. yd.	18,100	$1.20	$ 21,720.00	$1.20	$ 21,720.00
Fill	Cu. yd.	1,620	.90	1,458.00	.60	972.00
Base for concrete	Cu. yd.	1,030	3.20	3,296.00	4.50	4,635.00
Riprap	Cu. yd.	11,200	3.20	35,840.00	4.50	50,400.00
Round piles	Lin. ft.	31,200	.70	21,840.00	.80	24,960.00
Sheet piles, 12-inch	Ft. B. M.	247,000	100.00M	24,700.00	125.00M	30,875.00
Sheet plies, 4-inch	Ft. B. M.	56,000	105.00M	5,880.00	125.00M	7,000.00
Common timber	Ft. B. M.	295,000	80.00M	23,600.00	75.00M	22,125.00
Deck timber	Ft. B. M.	150,000	90.00M	13,500.00	80.00M	12,000.00
Oak timber	Ft. B. M.	158,000	120.00M	18,960.00	100.00M	15,800.00
Concrete	Cu. yd.	6,030	7.10	42,813.00	9.00	54,270.00
Pipe, 3-inch	Lin. ft.	1,470	1.00	1,470.00	1.20	1,764 00
Pipe, 1½-inch	Lin. ft.	1,480	1.00	1,480.00	.45	666.00
Drip pockets	Number	3	30.00	90.00	15.00	45.00
Structural steel	Pound	73,200	.08	5,856.00	.08	5,856.00
Reinforcing bars	Pound	52,600	.06	3,156.00	.06	3,156.00
Forgings	Pound	433,000	.06	25,980.00	.12	51,960.00
Bolts, etc.	Pound	98,000	.07	6,860.00	.10	9,800.00
Iron castings	Pound	246,000	.06	14,760.00	.055	13,530.00
Steel castings	Pound	82,500	.08	6,600.00	.10	8,250.00
Total				$279,859.00		$339,784.00

POWDERED MILK.

The Ekenberg milk product, put out by the Ekenberg Milk Products Co. of Cortland, N. Y., is meeting with great favor with the vessel supply trade of the Great Lakes, and the following have arranged to carry it in stock:

Hausheer & Sons Co., Cleveland, O.
Cheney's Sons, Ashtabula, O.
Henry Beckman & Sons, Erie, Pa.
P. T. Gunn, Buffalo, N. Y.
Great Lakes Supply Co., Buffalo and Duluth.
Graham Sons, Buffalo and Duluth.
Smith & Yendall, Detroit, Mich.
John W. Schlasser, Milwaukee, Wis.
Nic Bur, Green Bay, Wis.
T. M. Sullivan, Chicago, Ill.
The Enterprise, Sheboygan, Wis.
Zepp Bros., Toledo, O.
Schuette Bros. Co., Manitowoc, Wis.
Tomson Co., Manitowoc, Wis.
Chicago Lumber Co., Manistique, Mich.
Atkins & Co., Escanaba, Mich.
H. Bettner, Lorain, O.
Reagan & Gawn, Lorain, O.
Buckley & Douglass, Manistee, Mich.
Geo. Gougeon, West Bay City, Mich.
Walthern Dept. Store, Bay City, Mich.

TRADE NOTES.

The Fort Wayne Electric Works, Fort Wayne, Ind., has just issued Bulletin No. 1106, devoted to Direct Current Switchboard Panels for small plants, and two booklets, one devoted to Fort Wayne fan motors and one to Fort Wayne A C Arc Systems.

The car ferry L. C. Featherstone was recently launched at Port Bolivar, Texas, for the Gulf & Interstate Railway, the short line between Beaumont and Galveston. The car ferry is intended for transfer purposes between Galveston and Port Bolivar. It is 240 ft. long and 40 ft. beam, having a carrying capacity of 18 freight cars.

Peter Smith, Pascagoula, La., has received an order from the Southern Dredging Co. of Mobile, Ala., for a new dredge.

DAM NO. 8, OHIO RIVER.

Abstract of proposals for constructing 700 feet of navigation pass, Dam No. 8, Ohio river, received in response to advertisement dated Feb. 27, 1908, and opened at Wheeling, W. Va., on March 27, 1908, by Capt. F. C. Boggs, Corps of Engineers, U. S. A.:

Article.	Designation.	Quantity.	1. Sheridan-Kirk Contract Co., Cincinnati, O. Rate.	Amount.	2. The Dravo Contracting Co., Pittsburg, Pa. Rate.	Amount.	3. The T. A. Gillespie Co., Pittsburg, Pa. Rate.	Amount.
Excavation	Cu. yd.	25,000	$ 1.50	$ 37,500.00	$ 1.00	$ 25,000.00	$ 1.20	$ 30,000.00
Fill	Cu. yd.	1,920	.50	960.00	.55	1,056.00	.90	1,728.00
Base for concrete	Cu. yd.	1,030	3.00	3,090.00	4.25	4,377.50	4.20	4,326.00
Riprap	Cu. yd.	11,200	4.00	44,800.00	4.25	47,600.00	4.20	47,040.00
Round piles	Lin. ft.	25,900	.70	18,130.00	.75	19,425.00	.70	18,130.00
Sheet piles, 12-inch	Ft. B. M.	237,000	80.00M	18,960.00	120.00M	28,440.00	105.00M	24,885.00
Sheet piles, 4-inch	Ft. B. M.	56,000	100.00M	5,600.00	120.00M	6,720.00	105.00M	5,880.00
Common timber	Ft. B. M.	295,000	70.00M	20,650.00	70.00M	20,650.00	80.00M	23,600.00
Deck timber	Ft. B. M.	150,000	70.00M	10,500.00	75.00M	11,250.00	90.00M	13,500.00
Oak timber	Ft. B. M.	158,000	90.00M	14,220.00	100.00M	15,800.00	120.00M	18,960.00
Concrete	Cu. yd.	6,030	9.00	54,270.00	9.00	54,270.00	8.60	51,858.00
Pipe, 3-inch	Lin. ft.	1,470	1.00	1,470.00	1.15	1,690.50	1.00	1,470.00
Pipe, 1½-inch	Lin. ft.	1,480	.70	1,036.00	.40	592.00	1.00	1,480.00
Drip pockets	Number	3	6.50	19.50	15.00	45.00	30.00	90.00
Structural steel	Pound	73,200	.08	5,856.00	.07	5,124.00	.08	5,856.00
Reinforcing bars	Pound	52,600	.06	3,156.00	.05	2,630.00	.06	3,156.00
Forgings	Pound	433,000	.09	38,970.00	.10	43,300.00	.06	25,980.00
Bolts, etc.	Pound	98,000	.065	6,370.00	.09	8,820.00	.07	6,860.00
Iron Castings	Pound	246,000	.06	14,760.00	.06	14,760.00	.07	17,220.00
Steel castings	Pound	82,500	.125	10,312.50	.09	7,425.00	.08	6,600.00
Total				$310,630.00		$318,975:00		$308,619.00

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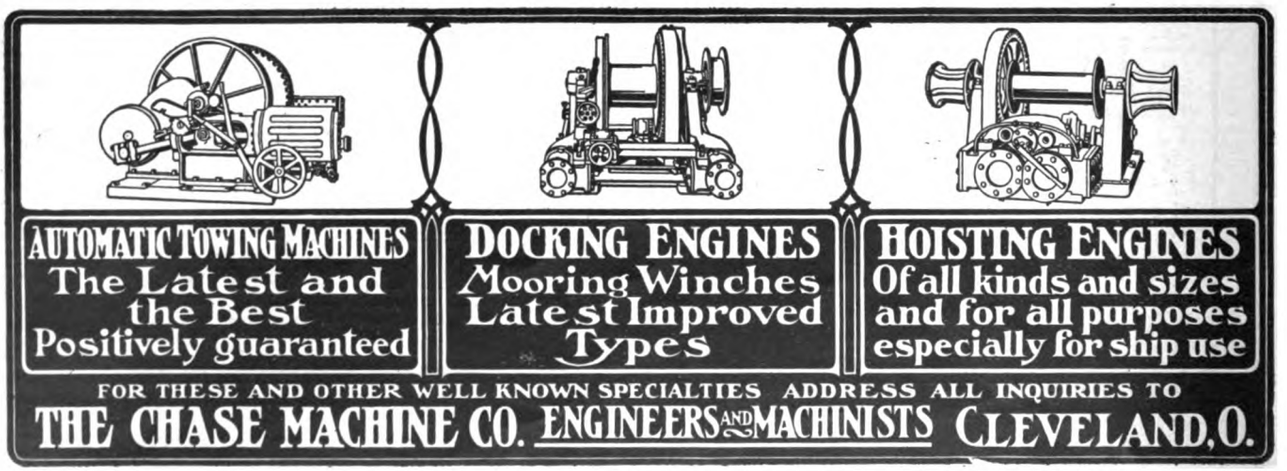
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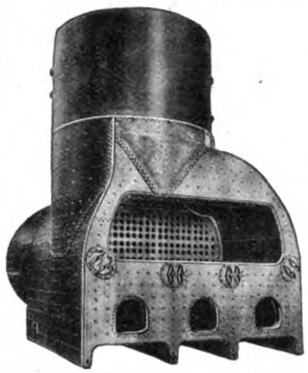

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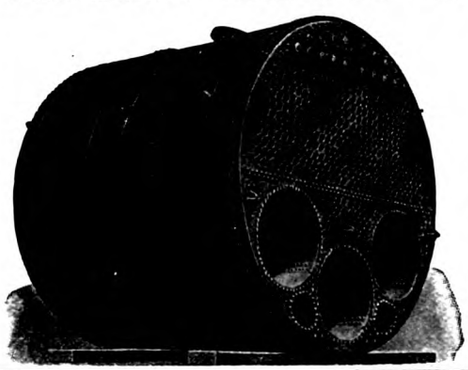

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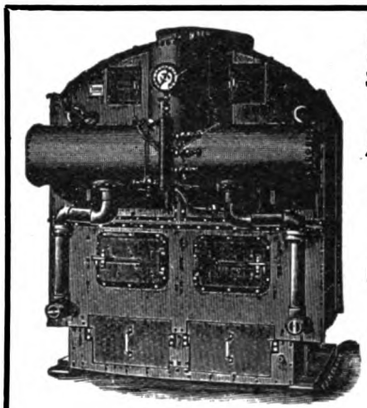

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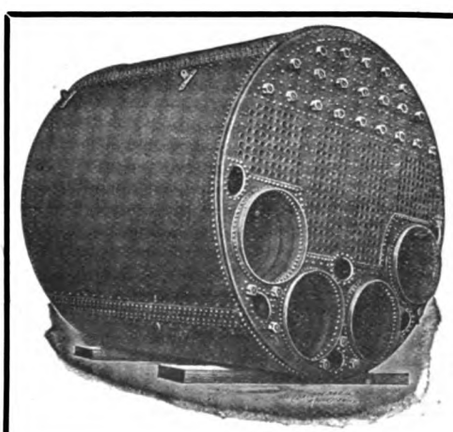

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Proposals should be accompanied by plans and specifications of hull and machinery, showing general arrangements and dimensions, speed, cargo capacity, accommodations for crew, etc., also statement of time and place of holding trial trips, with results of trial, and if the vessels have been in actual service, the actual bunker and cargo capacity and speed shown in service, together with any other particulars tending to show the value of the vessels offered for service as steam colliers for the United States Navy. Proposals should also be accompanied by a statement showing where and when the vessels were built, whether regularly inspected during building by a registration society, stating the name of the society. Bidders should state when and where the collier or colliers offered in the bid can be inspected and tried. All bids should be for vessels complete in all respects and ready for sea, including all tools and equipment required by the navigation laws of the United States. Forms of proposal may be had upon application to the Navy Department.

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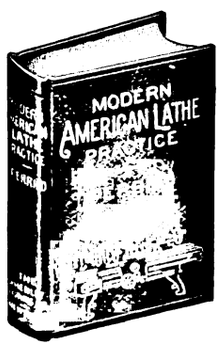

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DREDGING, PILE DRIVING, AND SUBMARINE PIPE LAYING.

Canal Street, West of First Avenue,

Milwaukee, - - Wisconsin.

Buffalo Dredging Co.

GENERAL CONTRACTORS ON SUBMARINE WORK

Office D. S. Morgan Bldg. BUFFALO, N. Y.

Dunbar and Sullivan DREDGING Company

BUFFALO, N. Y.

REMOVE SUBMARINE ROCK OR EARTH

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BUYERS' DIRECTORY

Advertisements can be found readily by reference to the Alphabetical Index.

AIR COMPRESSION, HOISTS.
Great Lakes Engineering Works.. .....Detroit.

AIR PUMPS AND APPLIANCES.
Fore River Ship & Engine Co..... ..... Quincy, Mass.
Great Lakes Engineering Works... ..... Detroit.

ANCHORS.
Admiral Anchor Co.....Chester, Pa.
Bowers, L. M. & Co..... ..... Binghamton, N. Y.

ANTI-FRICTION METALS.
Cramp, Wm. & Sons...Philadelphia.

ANTI-RUST COATINGS.
Hardy Paint & Varnish Co..... .....Toledo, O.

ARTIFICIAL DRAFT FOR BOILERS.
American Ship Building Co..... ..... Cleveland.
Detroit Ship Building Co...Detroit.
Great Lakes Engineering Works... ..... Detroit.

ASH EJECTORS.
Great Lake Engineering Works.... ..... Detroit.

ATTORNEYS AND PROCTORS IN ADMIRALTY.
Gilchrist, Albert J.....Cleveland.
Goulder, Holding & Masten..... ..... Cleveland.
Hyner, P. D..... ... Erie, Pa.
Hoyt, Dustin & Kelley...Cleveland.
Jenkins, Russell & Eichelberger.... ..... Cleveland.
Kremer, C. E.....Chicago.
MacDonald, Ray G.....Chicago.
Marshall, Alexander..Duluth, Minn.
Shaw, Warren, Cady & Oakes..... ..... Detroit.

BAROMETERS, MARINE GLASSES, ETC.
Ritchie, E. S. & Sons..... .....Brookline, Mass.

BLOCKS, SHEAVES, ETC.
Boston Lockport Block Co..... ..... Boston, Mass.

BOAT BUILDERS.
Drein, Thos., & Son..... .....Wilmington, Del.
Truscott Boat Mfg. Co..... .....St. Joseph, Mich.

BOILER COMPOUNDS.
Bird-Archer Co.....New York.

BOILER MANUFACTURERS.
Almy Water Tube Boiler Co..... .....Providence, R. I.
American Ship Building Co..... ..... Cleveland.
Atlantic Works.....East Boston, Mass
Briggs, Marvin.....New York.
Chicago Ship Building Co.....Chicago
Copeland Co., E. T.....New York. (Copeland Scotch Improved.)
Cramp, Wm. & Sons..Philadelphia.
Delany, P. & Co...Newburgh, N. Y.
Detroit Ship Building Co..Detroit.
Fletcher, W. A. & Co..... .....Hoboken, N. J.
Fore River Shipbuilding Co..... .....Quincy, Mass.
Great Lakes Engineering Works... ..... Detroit.
Kingsford Foundry & Machine Works.....Oswego, N. Y.
Maryland Steel Co..... .....Sparrow's Point, Md.
Marine Iron Works.....Chicago.
Milwaukee Dry Dock Co..... ..... Milwaukee.
New York Shipbuilding Co..... .....Camden, N. J.
Quintard Iron Works Co..... .....New York.
Roberts Safety Water Tube Boiler Co..... New York.
Superior Ship Building Co..... .....Superior, Wis.
Toledo Ship Building Co....Toledo.

BOILER STAYBOLTS, IRON OR STEEL, HOLLOW OR SOLID.
Falls Hollow Staybolt Co..... .....Cuyahoga Falls, O.

BRASS GOODS.
Michigan Lubricator Co.....Detroit.
Penberthy Injector Co..... .....Detroit, Mich.

BRASS AND BRONZE CASTINGS.
Cramp, Wm. & Sons...Philadelphia.
Fore River Ship & Engine Co..... .....Quincy, Mass.
Great Lakes Engineering Works... ..... Detroit.

BRIDGES, BUILDERS OF
Scherzer Rolling Lift Bridge Co.... ..... Chicago.

BUCKETS, ORE AND COAL.
Brown Hoisting & Conveying Machine Co.....Cleveland.

CABIN AND CABINET FINISHING WOODS.
Martin-Barriss Co.....Cleveland.

CABLE GREASE.
U. S. Graphite Co., Saginaw, Mich.

CANVAS SPECIALTIES.
Baker & Co., H. H.....Buffalo.
Upson-Walton Co.....Cleveland.

CAPSTANS.
American Ship Windlass Co..... .....Providence, R. I.
Dake Engine Co..... .....Grand Haven, Mich.
Hyde Windlass Co.....Bath, Me.
Marine Iron Wks.....Chicago, Ill.

CASTINGS (Brass and Bronze).
Griscom-Spencer Co., New York City.

CASTINGS (Steel).
Otis Steel Co.....Cleveland.

CEMENT, IRON FOR REPAIRING LEAKS.
Smooth-On Mfg. Co..... .....Jersey City, N. J.

CHAIN CONVEYORS, HOISTS.
Brown-Hoisting Machinery Co..... .....Cleveland, O.
General Electric Co..... .....Schenectady, N. Y.

CHAINS.
Seneca Chain Co.....Kent, O.

CHAIN HOISTS.
Boston & Lockport Block Co..... ..... Boston, Mass.

CHARTS.
Penton Publishing Co.....Cleveland.

CIRCULATORS (Automatic.)
Copeland Co., E. T.....New York.

CLOCKS (Marine and Ship's Bell) AND CHRONOMETERS.
Ritchie, E. S. & Sons..... .....Brookline, Mass.

COAL PRODUCERS AND SHIPPERS.
Hanna, M. A. & Co.....Cleveland.
Lorain Coal & Dock Co..... ..... Cleveland.
Pickands, Mather & Co...Cleveland.
Pittsburg Coal Co.....Cleveland.
Toledo Fuel Co.....Toledo, O.

COAL AND ORE HANDLING MACHINERY.
Brown-Hoisting Machinery Co..... .....Cleveland.

COMPASSES.
Ritchie, E. S. & Son..... .....Brookline, Mass.

COMPOUNDS—LUBRICATING.
Cook's Sons, Adam .New York City.

CONDENSERS.
Great Lakes Engineering Works... ..... Detroit.
Wheeler Condenser & Engineering Co. .....New York.

CONTRACTORS FOR PUBLIC WORKS.
Breymann Bros., G. H.....Toledo.
Buffalo Dredging Co.....Buffalo.
Dunbar & Sullivan Dredging Co.... .....Buffalo.
Griscom-Spencer Co., New York City.
Great Lakes Dredge & Dock Co.... ..... Chicago.
Starke Dredge & Dock Co., C. H... ..... Milwaukee.
Sullivan, M. .....Buffalo.

CONVEYORS (Portable).
Spence Mfg. Co.....St. Paul, Minn.

CORDAGE.
Baker & Co., H. H.....**Buffalo.**
Great Lakes Supply Co..... .....Buffalo and Duluth.
Columbian Rope Co...Auburn, N. Y.
Samson Cordage Works. Boston, Mass.
Upson-Walton Co.....**Cleveland.**

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